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ABSTRACT

This report reflects the status of conceptualization, progress, and partial implementation of a system of program planning and budgeting (PPB) at the University of Georgia (UGA). Emphasis is placed on detailed information flow necessary for implementation of a PPB system, how the data files existing at UGA will support further development and implementation, and the end products in terms of the PPB system itself, including an appraisal of progress in broad terms. The appendix includes related material. (Author/MJM)

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June 20, 1972

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SYSTEM OF PROGRAM PLANNING & BUDGETING

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June 20, 1972

FOREWORD

The following pages reflect the status of conceptualization, progress and partial implementation of a System of Program Planning and Budgeting at the University of Georgia.

The Project Team as a group has to be credited for the achievements which are documented in this paper. Ed Morris and Joe Waters have to be given much of the credit for expressing such progress. Joe Waters has been responsible for co-ordinating the information flow leading to a course major field matrix. Ed Morris has prepared most of the charts and has researched the information flows. The writing of the report itself has been a co-ordinated effort.

A. A. Sterns

Director

15 June, 1972

UNIVERSITY OF GEORGIA

SYSTEM OF PROGRAM PLANNING & BUDGETING

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UNIVERSITY OF GEORGIA

SYSTEM OF PROGRAM PLANNING & BUDGETING

STATEMENT OF PROGRESS

Since June 1970 the Ford Foundation (Grant No. 690-0660) has been suporting a project to develop and implement an integrated system of Planning, Programming and Budgeting.

The Project Team has now crossed the halfway point in its strive to live up to the intentions as explicated in the grant proposal.

The following paper shall document and explain:

(A) The end products of the PPB System fully implemented

(B) An appraisal as to where we will stand on each major component in the plan of action upon termination date of the Ford grant

(C) The plan of action including the following details:

1. Need for access to data elements and data files

2. Information flows, i.e., end products or reports to be expected from the data utilized and how the end products or reports are to be used by all user levels for the purposes of PPBS

3. Manpower required to fully implement both in terms of total manpower and specialized manpower such as computer programmers

4. Cost estimates for each phase of the plan

5. Time phasing and priorities of each component of the total plan

(D) The plan of action considering both the University of Georgia and the University System of Georgia.

Part I of this paper is intended to detail information flows necessary for implementation of PPB System and illustrates how the data files presently existing at the University of Georgia will support its further development and implementation. Emphasis is given in this part as to areas where the existing UGA MIS must be improved as far as its usefulness to PPBS is concerned.

Part II defines the end products of the system in organizational terms.

In part III it is intended to define the end products in terms of the PPB system itself, providing an appraisal of progress in broad terms and time phasing of activities to the termination

date of the Ford grant in June 1973.

An estimate of manpower needs for implementation, cost of implementation and annual operations is contained in Part IV.

Part V is a glossary of terms.

The Ford grant stipulates that the system to be developed have universal applications. In the development of the system and during the implementation attempts at the University of Georgia, special attention has been and will be given to such universal applicability. Since this is a Georgia project, the usefulness of the PPB System for all 27 institutions within the State of Georgia University System has always been in the mind of the Project Team.

Once the PPB System is developed at the University of Georgia it will provide program budgets, an integrated planning process at all organizational levels, an output oriented program structure and the information required to suport integrated planning, programming and budgeting. The system will be logically based and should be readily understood by all levels within the University.

PART I

INFORMATION FLOW

It is the belief of the Project team that implementation of a PPB System within the University will only be successful if (1) the information flow is initiated by the department head[1]; (2) certain information not relevant to upper levels remain with the department head, and (3) a co-ordinated and uninterrupted information flow, well timed, reaches each level of the University for their planning and decision making needs. While information will move to upper levels, co-ordinated information must move back to lower levels within set time spans. Any such system must be flexible!

In this Part the information flow is traced from individual faculty members to the top administration. Illustrations of forms and report formats are provided for each level in the Appendix. Explanations of each tentatively proposed form and how its use is suggested in the support of an integrated system of planning, programming, and budgeting are provided in this section.

Two anchor charts are provided to set a framework within which the developing system is explained. The first chart, (page 4) "University of Georgia Information Flow With PPBS", demonstrates why existing selected informational files are supportive of PPBS and thus require access by the Project Team. The employment of the data from these files in the PPB System is also depicted. Problems of securing information in a useable format are foreseen due to the suboptimized, non-compatible, geographically dispursed nature of the present information layout.

Because of such handicaps we have only through complicated and time consuming computer-programming been able to interconnect student credit hours (SCH) to relevant output categories, i.e. relevant to programs of degree majors.

The purpose of this programming effort is to bring information contained in existing files into perspective of

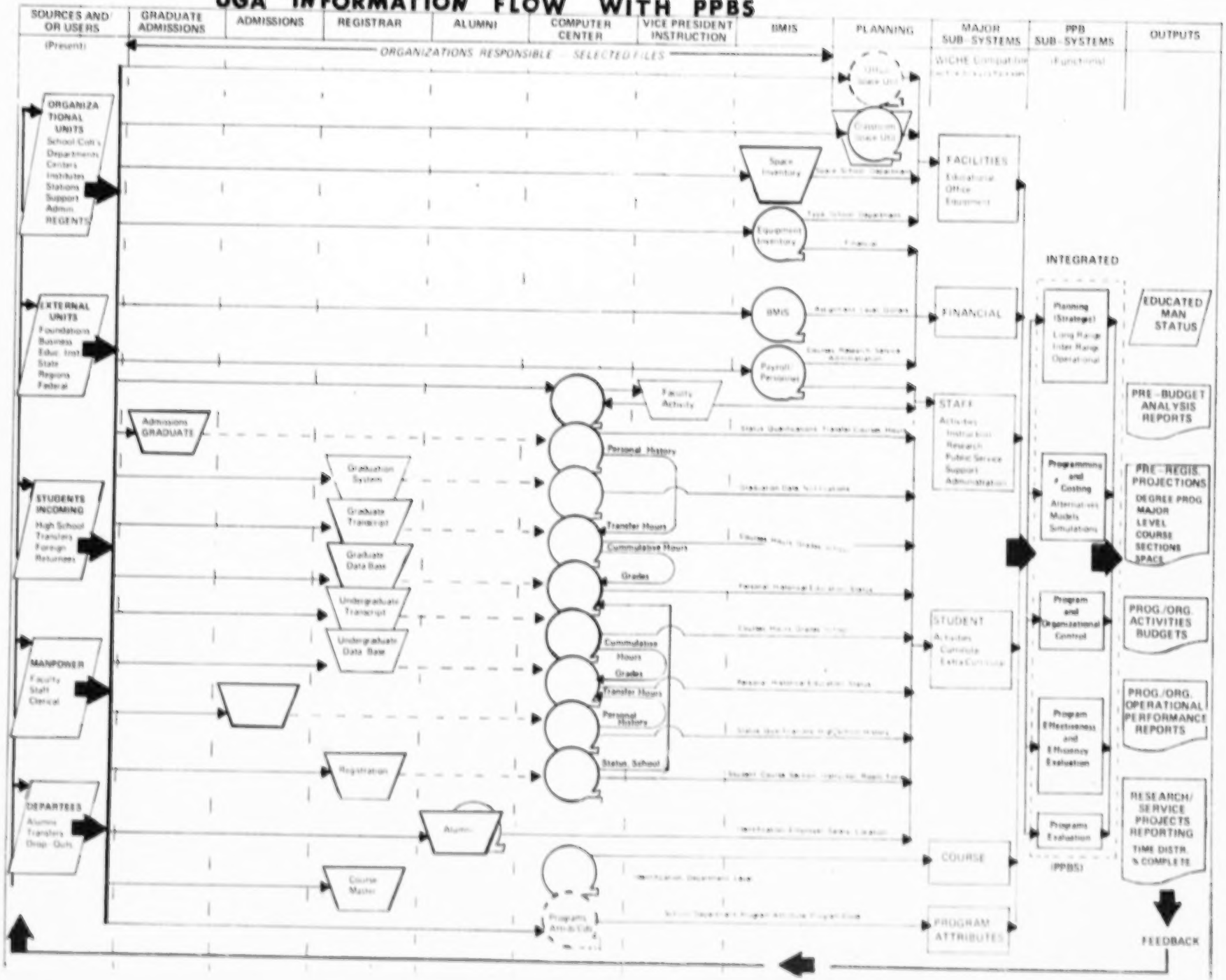
(a) A degree-major oriented subsystem.

(b) Subsystems which will gain relevance to planning, programming and budgeting.

(c) Output and feedback connotations.

The essential data relating to student major by quarter is presently *not* available in the existing data bases. Such information relating to degree major is *essential* not only to the development of the PPBS but also to any future development of institutional research.

UGA INFORMATION FLOW WITH PPBS



The second anchor chart (page 6) "UGA Information Flow for Selected Programs", depicts and *summarizes* the upward flow of planning, programming, and program budgeting information from the program element operations level to the University of Georgia program summary level. With this chart it is intended to emphasize the responsibility and authority for information by each organizational level in the planning and program budgeting process. The formats of the information at each level will be elaborated in detail. (Forms referred to by letter are in the Appendix.)

1. *The Individual Faculty Member*—the individual faculty member has responsibility for completing three basic data forms.

(a) the Course-Objective Inventory, —Form A (Appendix)

(b) the Research Project Inventory, —Form B (Appendix)

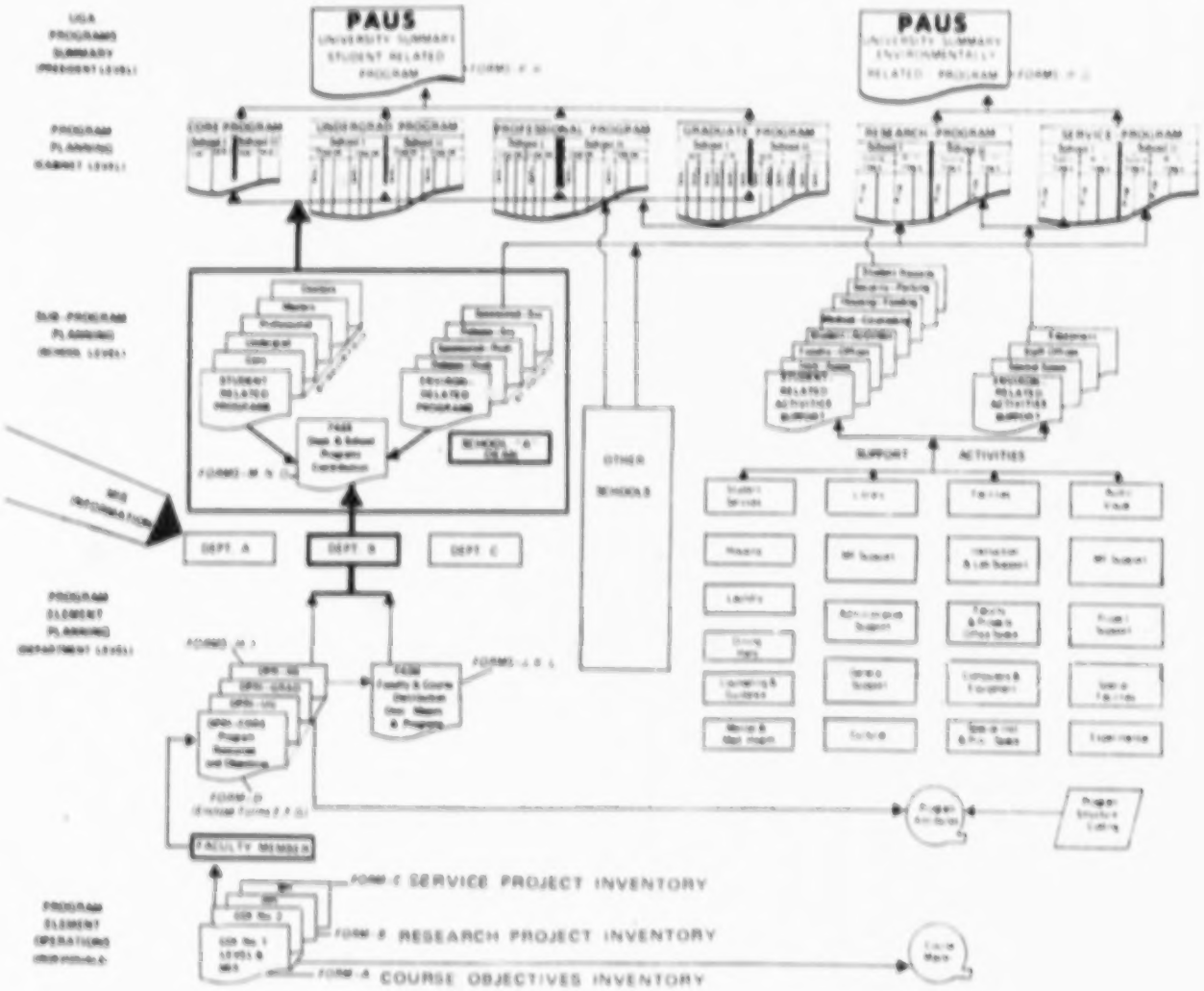
(c) the Service Project Inventory, —Form C (Appendix)

Courses are the basic program units, *the program elements*, of the student related program. The *individual research and service projects* are program elements of the environmentally related program. The faculty member is required to state objectives for the program elements under his responsibility. The completed sets of forms, from the faculty members, are forwarded to the department head.

The structure and priority ranking of a program element, i.e. a course, depends on the importance of the objectives inherent in such elements. "Objectives" applied to elements are *intermediate* objectives, the importance of which might be more appropriate for managerial decisions within an organizational unit (i.e. English Department), than for program output decisions (i.e. AB – English) to which the element contributes. The managerial connotation makes the statement of objectives more related to the Zero-Budgeting ideals which are only one potential tool within a PPB System.

2. *The Department Head*—the department head is the focal point for integrating information necessary for the planning process and program budgeting. He receives the above required information from his faculty and staff. In addition he also has the data bank available where vital information is stored – information which through the efforts of the Project Team has been programmed to be compatible with his needs and is tailored to the PPB System. For some time the Project Team will have to assist the department head to assure that the needed information reaches him. Information vital to departmental planning must flow back to the departmental head from upper level decision makers. While this information flow is envisioned to be largely automatic,

UGA INFORMATION FLOW FOR SELECTED PROGRAMS



a certain amount of assistance is required from the Project Team. It is expected that the institutional research office *will assume responsibility* for providing this data and analysis after the project terminates. The discussion on the upward information flow will be interrupted so that specific data needs of PPBS pertinent to the department head may be elaborated.

(a) The Course-Major Field Matrix[2]

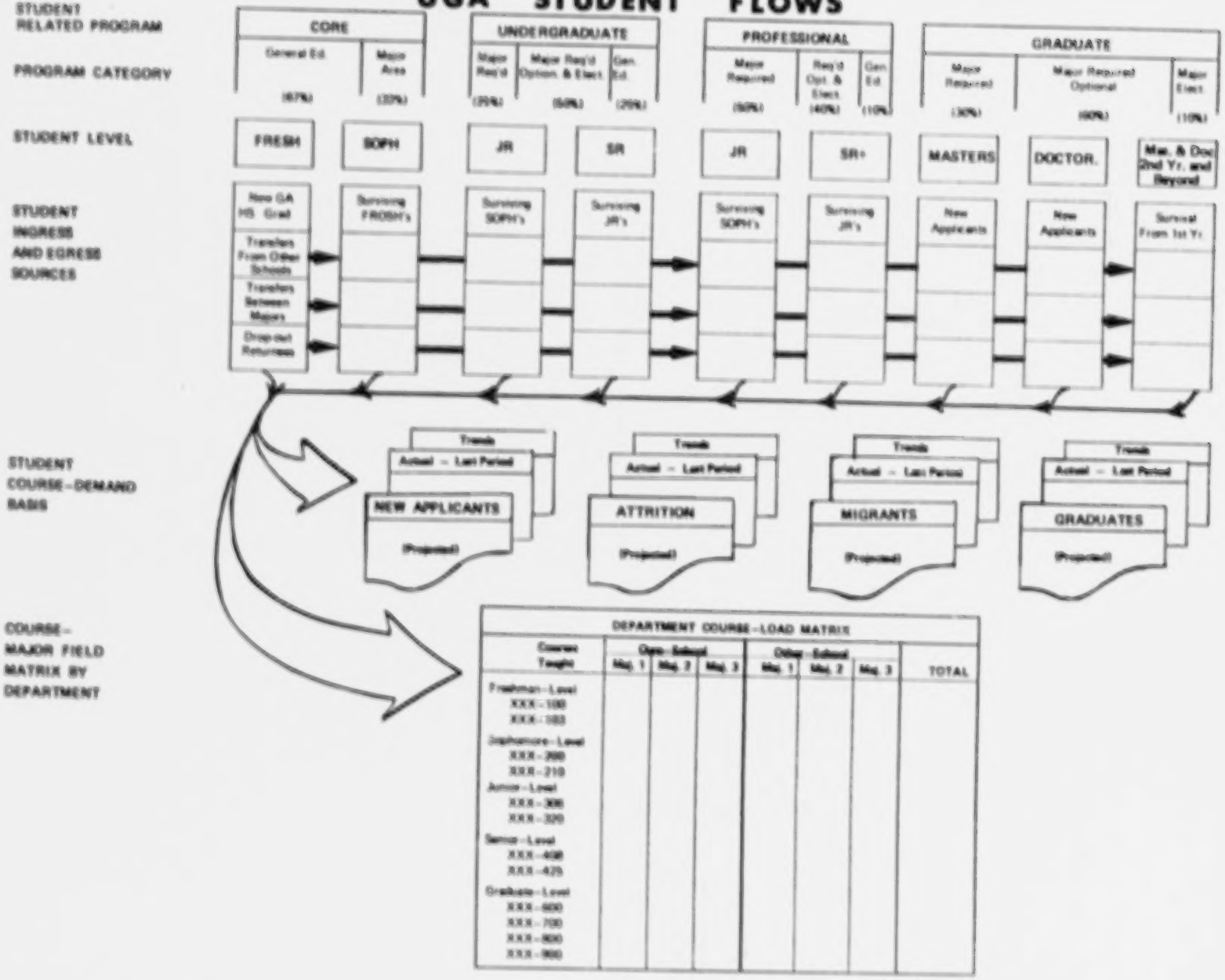
The third schematic illustrated on the following page depicts *a theoretical student flow* at the University of Georgia and a course load matrix[3].This matrix is the departmental report based upon student flow patterns and provides the department head with bases for making decisions about course offerings. With proper student flow input, it will be the basis for projecting future course information such as: student head count, student EFT, student credit hours, and student contact hours. To use the matrix as a planning tool, each matrix-cell can be used to identify the probabilities which the enrollment pattern signifies, e.g., the probability that major 3, school 4 will take course XXX210. The schematic shown on page 10 illustrates such probabilistic outcomes for a representative department and a particular major.

The matrix under development is tailored to UGA specifications and organizes the content of the matrix to follow a restricted discipline level, e.g., confined to UGA major fields. The matrix developed by NCHEMS at WICHE is also keyed to student/course enrollments. In the UGA matrix the enrollment basis for decisions with regard to course offerings minimizes unwanted repercussions on students and/or on class sizes.

The "Probability Matrix" is designed as a planning tool for the head of the department. For the case illustrated, an average of 125 students were forecasted — from historical data — to graduate each year for a period of four years. Thus the matrix indicates that, of the 500 students majoring in accounting during a four year period, ACC 111 will be taken by 49% of those students in the first year, 45% in the second year, 3% in the third year and 2% in the fourth year. The table will also reveal cumulative results, e.g., that offer the third year 96% of Accounting majors will have taken ACC 370.

However such a "matrix" is still much too simplistic. The *Student Flow Schematic* illustrates the impact of migration. The probabilistic matrix therefore must be improved by taking student migration into the picture. The most important inclusion will be to depict the courses taken in other institutions for which a degree major has received credit when transferring to the University of Georgia.

UGA STUDENT FLOWS



This, however, would still not make the matrix a real viable planning tool! While the above described matrix gives a good indication of a behavioral pattern as to taking certain courses at the certain levels of the educational process of a degree major, it would give the departmental head only knowledge of one aspect in deciding his planning. The matrix will tell the decision maker what the enrollment pattern of a degree major is during a four year period; by developing more historical data this knowledge can easily be expanded for all 16 quarters, – summer quarters to receive individual attention. The matrix for degree majors will reveal a *"critical pattern"*, meaning that for at least his majors, certain classes have to be scheduled.The next priority, it is thought, would be to include the behavioral pattern of other degree majors which are *required* to take e.g., accounting courses; lastly the behavioral pattern of students who take, as in this case, accounting courses as electives.

We have a number of approaches to have data generated revealing the above for inclusion in the matrix. One would be the course inventory form (appendix E) transferred to computer tapes.

Starting with the matrix as exhibited, we would know that a certain number of degree majors take a certain course during a certain year in the four year period, e.g., in our case 295 students will take ACC 110 during the first year; 225 in the second year, while the students taking that course in the third and fourth year are negligible. If we also know that during the same period, 500 non-accounting majors take the same course, in our planning schedule we could direct the latter to taking that course in the third and fourth year; in other words, advisement and control as to student enrollment in a particular course could be channeled into planned patterns.

To conclude, the illustrated probabilistic matrix is only one module of a great number, which, when synchronized, will provide the viable information as the department head determines specific information needs.

(b) The Approved Course Listing

The listing from the present course master file will be provided. The file itself will be updated and expanded from information gathered during the first year of departmental planning and reporting. In addition, development of a "courses taught" file will be the main focus in the updating process. "Critical" courses will be emphasized by course and by department, e.g., courses which are a requirement in at least one major field or are prerequisites to a "required course". Within the course file, tabulation of historical information of SCH production will be attempted so that the file will become a truly viable planning tool.

PROBABILITY MATRIX
OF ACCOUNTING COURSES TO BE TAKEN
BY MAJOR: BBA – ACCOUNTING

ASSUMPTION: 5 YEAR AVERAGE TREND 125 STUDENTS GRADUATING;
OVER 4 YEARS AVERAGE ENROLLMENT 500 STUDENTS
PROBABILITY PERCENTAGE OF 500 ENROLLING IN EACH COURSE.

Course Number	First Year		Second Year				Third Year				Fourth Year			
					Cumulative				Cumulative				Cumulative	
	Number Students	Probability %	Number Students	Probability %	Number Students	Probability %	Number Students	Probability %	Number Students	Probability %	Number Students	Probability %	Number Students	Probability %
Acc 110	295	.5900	150	.3000	445	.8900	30	.0600	475	.9500	20	.0400	495	.9900
111	245	.4400	225	.4500	470	.9400	15	.0300	485	.9700	10	.0200	495	.9900
112a	5	.0100			5	.0100			5	.0100			5	.0100
113d	5	.0100			5	.0100			5	.0100			5	.0100
215	→		16	.0320	16	.0320	12	.0240	28	.0560			28	.0560
315							6	.0120	6	.0120	2	.0040	8	.0160
316							250	.5000	250	.5000	100	.2000	350	.7000
340							5	.0100	5	.0100			5	.0100
353			3	.0060	3	.0060	350	.7000	353	.7060	100	.2000	453	.9060
354			2	.0040	2	.0040	300	.6000	302	.6040	150	.3000	452	.9040
356							3	.0060	3	.0060	5	.0100	8	.0160
370							480	.9600	480	.9600	20	.0400	500	1.000
514							80	.1600	80	.1600	400	.8000	480	.9600
515							120	.2400	120	.2400	360	.7200	480	.9600
516											5	.0100	5	.0100
519											62	.1240	62	.1240
522							1	.0020	1	.0020	32	.0640	33	.0660
566							2	.0040	2	.0040	24	.0480	26	.0520
572							67	.1340	67	.1340	323	.6460	390	.7800
576							4	.0080	4	.0080	44	.0080	48	.0960
	550		396		946		1725		2671		1657		4328	

(c) Alumni Evaluation

Two reports from the alumni questionnaire study currently underway by the Project Team will be suplied to each department. The first report will discuss general trends and responses based upon all returns. The second will provide the information about and evaluations from the graduates relevant to individual departments. The second report will contain the following information:

a) Jobs and fields of graduates,

b) location of graduates by state,

c) salaries,

d) evaluations concerning career preparation,

e) evaluations concerning personal and social development.

(d) Annual Projected Openings by Field

A manpower Requirement Report specifying annual projected job openings in Georgia and nationwide by major field will be supplied to the department head for fields relevant to his students. The manpower report could be designed in a format illustrated on page 12.

197—			197—			197—		
Openings State of Georgia	Openings Nationwide	Number UGA Grad. *	Openings State of Georgia	Openings Nationwide	Number UGA Grad.	Openings State of Georgia	Openings Nationwide	Number UGA Grad.

* Alumni records reveal that approximately 70% of UGA graduates remain instate while the remaining 30% locate out-of-state.

Precise information as to the number of graduates in a given field that are employed in Georgia as opposed to those out of state will be developed over time as the alumni questionnaire becomes an annual undertaking.

The PPB Project Team will soon release a paper depicting manpower-education relationships. In that paper the sources of existing information shall be enumerated and methods will be indicated how to assess the reliability of such data. Furthermore, methods will be indicates as to finding data — sources and improving reliability of data.

UNIVERSITY OF GEORGIA

MANPOWER NEED/GRADUATES

SCHOOL _____ DEGREE PROGRAM _____ 1975 - 1980 on next two pages

Designation Degree Major	Openings State Ga.			Openings USA			Nationwide Graduates			State of Graduates			UGA Graduate		
	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974

12

(e) **Faculty Distribution Over Functions**

The present faculty effort report has the capability to relate information to the department head about how each faculty member's activities are distributed; in particular what his participation is in individual courses and in research and service activities. Additionally, direct costs per course, per student, and per student credit-hour must be provided for planning, programming and budgeting. The faculty effort report is tailored to provide the required information for each quarter. It must be empasized however, that *if the University administration* decides not to run this report for each quarter, if summary reports are not produced, and if it is not intended to provide specific output concerning direct cost per course, per student credit hour, per research project, as service project and other functions, the PPBS Project Team would have to find alternative methods to generate that information.

The Project Team is deeply involved in the study of cost application. An incomplete paper has already been released which elaborates on direct cost application to departments and is appended hereto. The continued study of cost and costing methods will be a responsibility of the Project Team.

The department head uses the information from his faculty and the external information from existing MIS files in his planning, programming, and program budgeting decision-making processes. To assist the department head in organizing his information along PPBS lines and for reporting to the next level, forms[4] have been devised for reporting current activities, associated dollar inputs, projected activities, projected costs, and statements of objectives. Forms D_1 and D_2 are summary forms for reporting planning and budget requirements for the instructional activity; one set of these forms is to be completed for each program in the Student Related Program supported by the department. Forms H and I are designed to report on the Environmentally Related Program activities in the department.

The Program Activities Departmental Summary (PADS), forms J, K, L, is the report of (a) how the department contributes to university programs and (b) the resources required for this contribution. The PADS, forwarded to the dean for his use and approval, are the basis of resource requests by the department head.

3.The Dean

The dean, upon receipt of PADS from his departments, is provided a firm basis for requesting and allocating resources in program terms. Departmental activity contributing to the programs and sub-programs will be the basis for the dean to make and justify decisions within his

school. Since the interrelationship of programs is intertwined in nearly all activities – courses, research, service – intercollege information becomes especially important at this level.

Recognized outputs of the school i.e., degree winner, approved research and service projects and contributions to programs in other schools will become the basis for allocation of resources. Resource requests in program terms are substantiated by the back-up documentation provided by the departments.

The dean summarizes his departmental information (PADS) into a Program Activity School Summary (PASS format as on Forms M, N, O). The PASS is forwarded to the vice presidential level.

4.The Vice Presidential (Cabinet) Level

Assuming that at the University of Georgia, the existing organizational structure still remains, *functional* decisions are expected to be made and so outlined on the vice presidential level. These offices would, therefore, have the responsibility of unifying the PASS's from the schools and incorporating support activities into the information flow. Support activities need not be directly related to any program segment, but could support *many or all* the programs within or across the prime program divisions of student related, environmentally related and inwardly directed programs.

It must be realized that some support-activities may represent "staff-functions" (to use an expression from organizational theory). Others may be program subdivisions of the inwardly directed program grouping, such as the activities of physical plant; others, such as the computer center, may represent investments and activities contributing to all three broad program divisions.

Within the vice presidential level efforts must be coordinated to distribute such support activities over the programs and present a total Program Activity University Summary (PAUS, forms P, Q, R) *to the President* for his further actions.

To test the validity of such an information flow with the approval from the President, implementation is in progress in selected colleges. The upward information flow has now been described with report formats at each PPBS user level specified. In addition to this upward flow, it is necessary to show how the information generated at each level is used in decision-making and how downward flow of information takes place.

The charts on the next two pages depict

(a) The academic year program budget cycle

(b) The long range planning program cycle.

Both of these charts reflect time phasing and general information flows from the lowest level of the hierarchy to the highest level and vice versa.

As soon as the selected implementation attempts have tested the conceptual assumptions, and, if necessary, changes in the system have been executed, it will be proposed to the President to implement University wide. It will be up to him to suggest to the Board of Regents a University systemwide acceptance.

Provided such acceptance is obtained, the Board of Regents would have the opportunity, upon analysis of the Program Activity University Summary documents, to issue program guidelines to the President for each of the primary programs. These guidelines could be couched in terms of dollar allocations, expected quantification and qualities of outputs from each program. The President would relay these guidelines to the V.P. level officers.

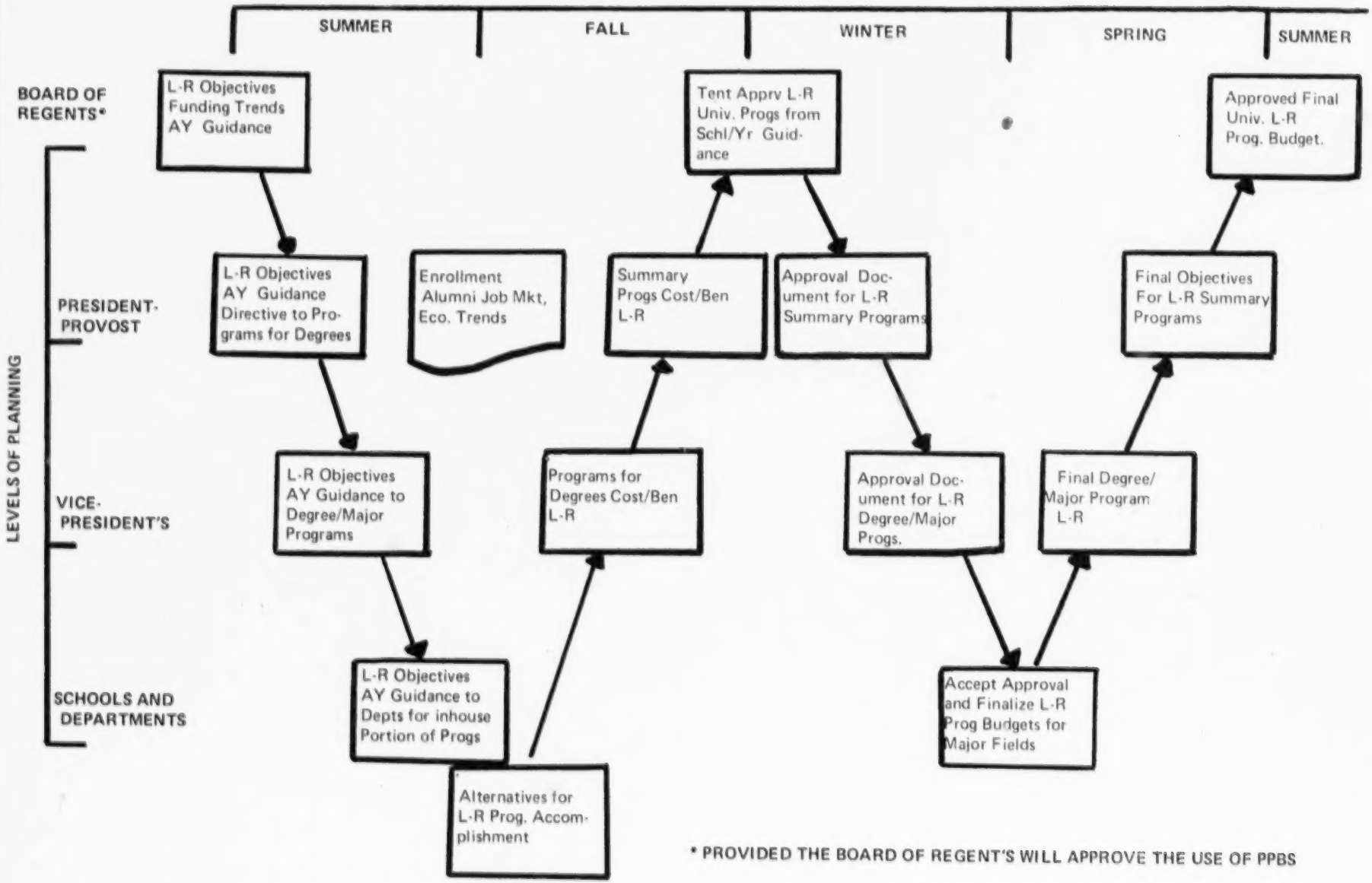
On the vice presidential level, guidelines are prepared for each sub-program within the particular functional area. Under the Vice President of Instruction, such *guidelines* would cover the number of graduates in a certain degree program, the production of SCH, the course curriculum and other factors influencing expected outputs and dollar allocations thereof.

The basis for these guidelines are the PASS and PAUS report submitted previously. Each school now can be allotted money on the basis of their contribution to programs. This allocation method is realized to be a radical change from existing procedures.

Presently monies are appropriated by the State of Georgia on the basis of a formula to the Board of Regents. The latter allots its resources on the basis of (submitted) line items to the individual institutions. The University of Georgia *allocates* the monies so alloted to individual schools. Program-budgeting is an alternative to formula-budgeting and to the various versions of "line-item" -budgeting.

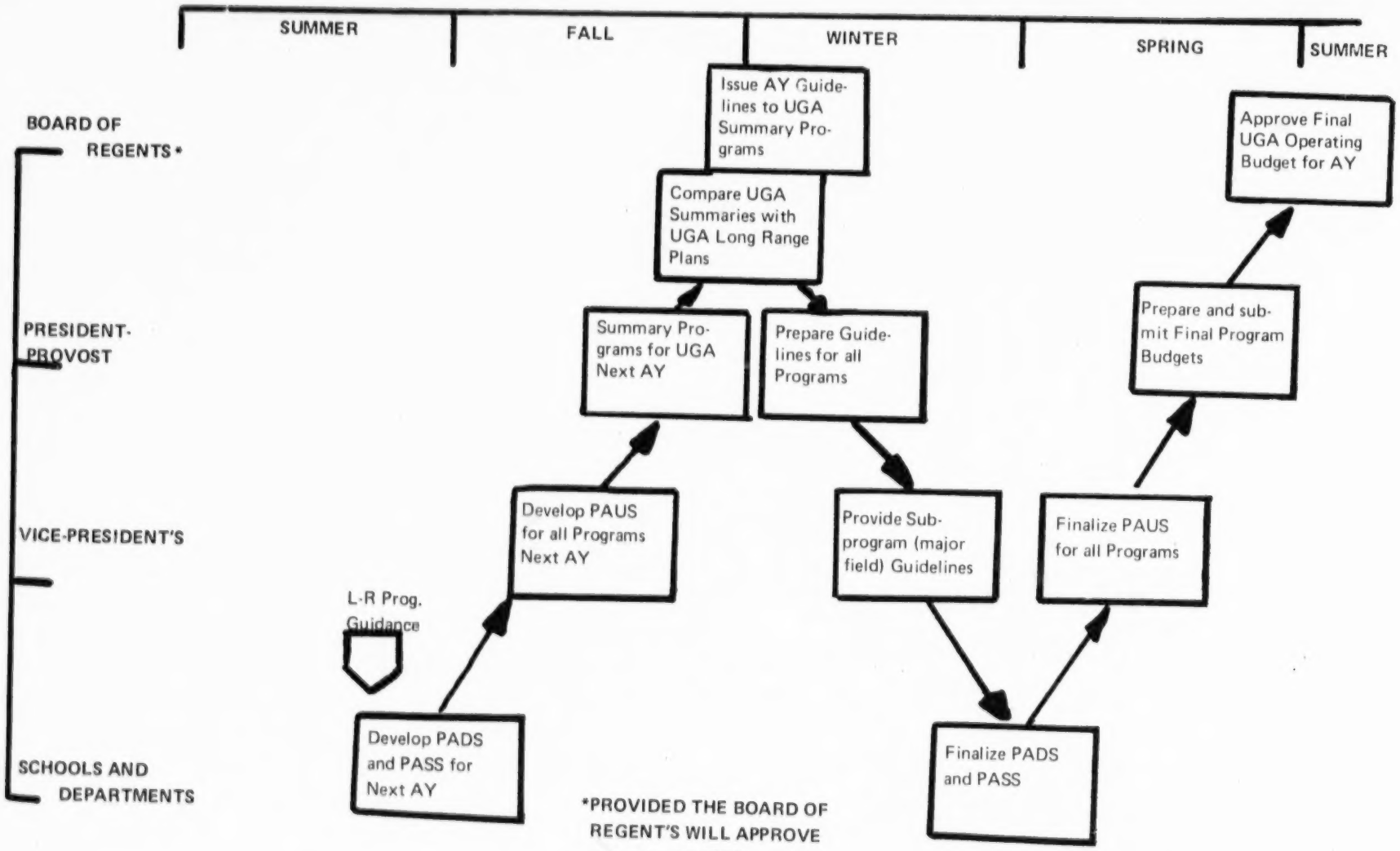
Once the reporting system is established in program terms, allocation of funds can be based on program delineations. The dean in turn requests funds and allocates resources on the basis of program categories. The dean would receive funds allocated to specific programs, i.e., $205,000 for the lower level program, $750,000 for the upper level program, $550,000 for the graduate program; etc. Since the dean has been provided with information on the program contribution of each organizational unit, he now knows how this money is to be distributed to achieve *the objectives* stated. He would then decide on the basis of substantiated departmental contributions to programs,

LONG-RANGE PLANNING PROGRAM-BUDGET CYCLE



* PROVIDED THE BOARD OF REGENT'S WILL APPROVE THE USE OF PPBS

ACADEMIC YEAR PROGRAM-BUDGET CYCLE



*PROVIDED THE BOARD OF REGENT'S WILL APPROVE THE USE OF PPBS

how much money in each program category should be allocated to each department, e.g., the upper level program in accounting which has as one of its outputs the BBA in accounting, the lower level program in General Business, etc.

While a system gives the top-level decision makers a *vista* of defined program outputs and the cost of such outputs, it also gives the lowest level "manager" a much greater flexibility in the deployment of the resources alloted to him.

The efforts of NCHEM at WICHE are similarly directed. To clarify the compatibility of the program structure as developed at WICHE with that developed at UGA a paper specificly dealing with that compatibility is attached.

PART II

The End Products of the Fully Implemented PPB System in Organizational Terms

The Departmental Level

General Overview

Department heads will have available a planning system which outlines in detail basic planning information, forecasted activities in relation to the various programs (lower level, upper level, professional, graduate, research, service, and continuing education). As moneys are foreseen to be allotted on the basis of program contributions, department heads will have the capability to plan both resource - generation and resource utilization. The time span of this planning will encompass, at least, the time necessary to carry a freshman through to graduation. And in such planning, research and service programs will play an important role. Thus the system will provide a means for a flexible formulation of resources and will give heads of departments the authority – balanced by accountability – within institutional constraints to use the available resources in a manner which best serves the activity goals of the department which in turn serve the goals of the various programs.

Since each activity-phase within the span of planning must have dollar values attached, the system within a department could presently be called a "planning-budgeting system". It is not a programming system since a department only makes contributions to the programs and sub-programs. A number of departments co-operate in serving many different programs. Overall program management is a matter of coordination within and between schools and is, therefore, a group responsibility of the various department heads with the deans. For the sake of simplicity and workability at this time, we see the integration of planning, programming, and budgeting at the school level with the departments treated as responsibility areas (cost centers).

The system under development provides for optimum planning with associated information on costs and the results of alternatives. Optimal planning implies the most effective and efficient use of resources to meet specified objectives. Modeling techniques such as the resource prediction models currently under development by NCHEMS will be employed for the evaluation of alternatives.

Costing in the present context is *not defined* as "cost finding" familiar to industrial costing but rather as resource-requirement costing and as managerial costing (standard-costing). Basic cost information is extracted from the present accounting system where line items are accumulated.

There is no attempt made in the system to allocate cost during the "process" so that the time elapsed will not hinder, the transferral of cost to outputs. The appended paper on costing should clarify this point.

Activities within each department to be considered in the planning process will include the following:

1. All instructional endeavors classified into meaningful groups (courses, seminars, laboratories, etc). This category also includes all generating processes – such as authorship of text books, and graduate student research which directly serves the instructional process.
2. All general or sponsored research projects not directly connected with the instructional process.
3. All service projects or processes.
4. All other activities not directly related to instruction, research, and service.

The forms to be completed by the departments as part of the planning process and supporting information will be provided through the Project Team.

The departmental planning budgeting system will provide the necessary information for the departmental planning process itself and will then be the basis for reports to be integrated by the schools and central administration.

The following summarizes the basic information needs of departments for purposes of a PPB System. (This list is not exhaustive).

1. A cohesive inventory of all instructional, research, and service activities.
2. The *indicative* costs of these activities.
3. The projection of activities over time to meet the objectives and goals of the department and of the programs which the department serves.
4. Alternative activities with cost indicators highlighted with regard to the feasibility of such activities within a stated time frame along with the arrangement of priorities to give the department head the opportunity for effective and efficient operation of his department.
5. An approximation of resources (not necessarily expressed in dollars) classified by categories available and resources to be generated.

6. Justification of all activities and of alternatives (cost indicators need not be the deciding criteria).

7. Relationships of departmental activities to the program-packages (majors) by means of recording number of students, credit-hours, contact hours, status of staff and space and equipment use. In case of research and service activities other significant indicators of program relationship; e.g., indicators of outputs with societal significance.

8. The recording of productivity measures where possible such as student/faculty ratio and utilization of available resources (classrooms, equipment, etc.)

9. The recording of educational or societal measures of achievement where possible. The latter is especially important in deciding and justifying curriculum deployment; i.e., will a particular course bring to the student the capability for better communication within his society, in what way will the instructional process improve his fitting into the real world.

Specific Information Needs

At present the department head does not know enough about the sub-program (s) (major) to which his department is a principal contributor. He also usually knows little about the other programs his department is serving. He does not have information about the contributions his department makes to other programs. To meet these and other needs, the system will provide:

A. An indication of department expense by program, i.e.,

Department X

Program	EFT	Dollars	Student Credit Hours	Costs/SCH
Lower Level	3.625	55,792	8,268	$ 6.50
Upper Level	8.000	146,160	14,405	10.15
Grad.	3.125	58,324	1,893	30.81
Total	14,750	260,276	24,586	$10.59

The above information indicates in gross terms the departmental cost contribution to programs. The real significance becomes more obvious when such indicators are broken out by sub-program (majors), i.e., how much does the department contribute to final outputs?

To make rational decisions about alternative methods of number of sections, class size, student level, etc., the department head must have such information. The dean of the school must

require such rationalization when he approves the various activities, the level of activities and the productivity factors. If courses are added to or cut from degree programs the program contribution information will be an important input to make decisions.

The appended paper on costing on page 10 illustrates some of these important relationships. The following tabular schematic may also emphasize the significance of specifying departmental program contributions.

	Department X Program Contribution											
	Lower Level			Upper Level			Professional			Graduate		
College & Major	EFT	SCH	$	EFT	SCH	$	EFT	SCH	$	EFT	SCH	$
Business												
Accounting												
Banking & Finance												
Business Systems												
.												
.												
Agriculture												
Total	3.6	8,288	55,792	8.0	14,405	146,160				3.125	1,893	58,324

B. An indication of costs by sub-program (major)

Departments budget their requirements by stating their material and personnel needs; the latter in both dollar and EFT values. They also state their curricula needs which means that they must, according to information available, plan for courses and other instructional activities as well as for intended research and service projects. Presently means are not available to bridge the above planning activities with program and sub-program areas. *For that reason this Office* will require from the MIS, *on a recurring basis*, information on student enrollment by course and by major and related information to bridge the gap between organizational units (departments, institutes, etc.), programs (core, undergraduate, etc.), program elements (courses and projects) and outputs (majors).

Obviously a great amount of recurring data might initially be produced. Due to the lack of historic data, such data is important; such data must be sifted, studied and then ways might be found to move for simplification.

This Office has, as of now, developed a computer program as to major-degree related elements and has interfaced that program with the existing data in MIS. Thus each department head can be provided with a list of instructional program elements (courses) which make up the major(s) he is primarily responsible for. Standard costs associated with each of these elements will be developed and summarized to give a crude indication of the instruction-related costs for each particular major.

The structuring of the various sub-programs is based upon what courses graduates in the last two years have taken to satisfy degree and major requirements. This information is illustrated on the next page as the Course Major Field Matrix. As of now, we will make the assumption that course patterns by major have not changed drastically in the past two years and consider the sub-structure unchanged *until* information on *students currently enrolled by specific majors can be obtained*. Such an assumption can easily be challenged; as historic information is gathered – and the Project Team is presently expounding the information for three quarters of the AY 1971/1972 – the validity of the assumption will be judged from such historic fact findings. Thus the course-major field matrix is being developed for all 1970 and 1971 graduates by major and school. It will, among other things, (1) provide essential information for the definition and revision of the sub-program (major) structures; (2) present deans and department heads with a summary of majors taught during the past four years; and (3) allow department heads to more accurately predict future instructional needs on the basis of the various course patterns by major. While this approach is similar to NCHEMS-RRPM, it is stressed again that it is tailored to UGA particularities.

Once the information sub-system, which will provide the matrix information, is developed, it should be a simple matter to provide a similar output to department heads for *currently* enrolled students which will allow for the determination of (1) the present composition of all courses taught in his department and (2) the number of enrollments of his majors outside his department and/or school. The course patterns by major which will be derived from this output are *essential* for class enrollment projections.

The opinion has been voiced that changes are too dynamic to be used as valid projections and such projections might be good only for a single year. Entering a polemic at this stage would

COURSE-MAJOR FIELD MATRIX*
19___ GRADUATES
SCHOOL OF BUSINESS

Majors

Courses By School By Department	Business Systems	Finance	Insurance	Management	Marketing	School of Business Total
English 101	20	65	31	171	171	
102	18	68	31	168	170	
121	14	41	17	124	119	
122	12	37	16	112	117	
.						
.						
.						
.						
.						
Total						
.						
.						
.						
.						
Math 100	17	64	31	164	163	
101	16	17	7	57	48	
235	14	63	27	136	156	
.						
.						
.						
.						
Math Total						
.						
.						
.						
Speech 108	5	13	9	60	51	
109	12	48	22	113	109	
.						
.						
.						
Speech Total						
.						
.						
ARB & Science Total						

*Head Count Enrollments.

not be fruitful, as it is true that a number of predictable and some less predictable variables have to be viewed during the planning stage. The importance is in the fact that the accumulation of historic data will provide a much better capability to weigh variables and thus develop better practical tools as we move along.

The matrix may be expressed in terms of headcount, EFT students, student credit hours, student contact hours, or the probability that a specific major will take a specific course. The type of presentation will depend upon the needs and policies of the decision maker.

We do believe that the decision makers, *at all levels* must express their view on the type of presentation so that it serves their needs and policies.However, there is no reason why a variety of quantitative denominators could not be used simultaneously.

C. Other important planning information to be provided by the department or by other offices through the project group include;

1. Statement and revision of *operational objectives and goals* for operating units, programs and program elements to be used in the evaluation of the degree of success of the units and programs. This information *will be derived* from the Self-Study, Departmental Program Report Forms, the Course Objectives Inventory and the Research and Service Project Inventory Forms. These are included in the appendix.

2. *Basic Course Information* to update the master course file, i.e., is the course part of a sequence, what is the present class composition, what is the maximum and minimum class and lab size, what text is used, by whom the course is required, and what are the course objectives. The data for this updating will be gathered manually by the department head from the *Course Objectives Inventory*, the *course master file*, and the *Departmental Program Requirements Form*.

Once such information is gathered, a relevant computer-program is prepared and the information is filed on tape to be updated in appropriate intervals to be decided on after the file has been compiled.

While the course-master-file has importance (presently 7255 courses are listed) the Project Team stresses the "courses taught" file and indicators to point to courses which are "critical" for the output of a degree-major. The update is also intended to include a change to discipline identification and/or changes in course hours. The Project Team realizes that predictive capabilities fall apart if clear definitions are not satisfied.

3. *Basic Information on Research and Service* (Sponsored, General, and Research Directly Related to Instruction). The Reserach and Service Projects Inventory and the departmental program requirements forms gather this information enabling the department head and dean to plan for future needs.

4. *Space Information* integration of the present system with program requirements from the Departmental Program Requirements form as well as integration with "Course Files".

5. *M anpower Information* gathered by the project staff from *existing data sources* to give decision makers better information on job market openings, trends, and characteristics of the labor force by discipline to assist in the prediction of demand for graduate by sub-programs.

6. *Evaluation of Outputs* results of studies by project staff and other groups indicating to the department head how successful his program contribution has been, e.g., types of positions held by alumni, percentage of graduates who go on to graduate school, feedback from employers, performance of majors on standardized major field examinations, etc.

There are indications that departmental heads have used ad-hoc methods to gather information of this type. Therefore the Project Team is convinced that they would use such information if it is generated through a system. If top administration demand program justification, *as they should*, to ensure using resources in the best manner, the departmental head should:

(a) Be forced to want the data,

(b) Be convinced that he needs the data,

(c) Make use of that data,

7. *Basic Planning Assumptions and Backup Planning Information* gathered from various offices and data sources both on and off campus. These will include present enrollment information with trends and projections for *university, school, department, programs,* and *majors* in addition to information on new or re-emphasized majors or programs.

8. *Evaluation of Degree of Objective Attainment* in terms of (1) cost, (2) benefit, and (3) effectiveness. The departments will receive assistance from members of the project group in:

a. Comparing course "standard costs" per student credit hour with actual costs.

b. Interpreting results of manpower and alumni studies.

c. Analyzing the effectiveness of objective attainment.

The "cost effectiveness" of a program dealing with the effective and efficient utilization of resources is judgmental at the departmental and deans level.

At the termination of the PPBS Project, analytical capabilities relating to effectiveness studies *will have been developed* within the University and manuals will be available for use in departments and schools.

9. *Basis for Long-Range Budgetary Requests* in terms of resource needs and income estimates. Information provided by department on their program resource requirement forms in conjunction with enrollment projections based on course major field projections will be used for needs and income estimation.

The system in the stage of development generates information capable of alternative decision making. The use of analytical tools to accomplish this is inherent. As various hypothetical situations may arise, such as the number of freshman ready for enrollment, the increase of junior colleges and its effect on freshman and sophomore enrollments, the effect of advanced placement, credit for exempted courses, remedial courses etc., the correlation of the various factors so known will accelerate the decision making process.

By the end of the project the following information will be available for each department:

1. A specific definition of each program structure in terms of the courses taken, the average number of hours, the impact of transfer students, etc.
2. Cost per program contribution to majors and graduates divided by lower level, upper level, professional, and graduate.
3. Contribution by other departments and schools to own majors.
4. The indicative cost of each program EFT input and credit hours output.
5. Preliminary methods of analysis for alternative inputs (cost effectiveness of alternatives weighed and adjudged – initially through very simple models indicative cost benefit in dollars or judgmental for each program).
6. Establishment of criteria to conform to the policies of the Board of Regents and of the University of Georgia:
   a. For program evaluation,
   b. For program priority decisions.
7. Suggested changes in formats for a more meaningful budgetary presentation, i.e., a compressed presentation for departmental budgets by

a. Line item,

b. Functions (as present),

c. Program contribution.

It is recommended by the Project Team that figures be in terms of actual expenditures for the previous year, estimated actual figures for current year (based on *six or nine* months of operation) and estimated expenditures for the request year.

The School Level

Information gathered at the departmental level and used in the decision making processes appropriate to the departments must be systematically sorted out and stratified with the information valid for the appropriate decision making processes at the School or College Level flowing to that level with proper *rapporting exchange being provided*. This information flow is depicted in the section on information needs.

Departmental activities contributing to the programs and sub-programs will be the basis for the dean to make and justify decisions within his school. Intercollege information becomes especially important at this level. *Recognized outputs* of the school, degrees produced, and contributions to programs in other schools is recommended to become the basis for allocation and budgeting of resources. Resource requests in program terms are substantiated by the backup documentation provided by the departments. A transitory period is envisioned to allow the old system to terminate.

Each department will report relevant data on forms such as that exhibited on page 10 of the appended "Costing Principles". Columns would have to be added to express planned efforts and costs.

Once such a system is established, *allocation of funds* can be based upon program delineations. Naturally this will have *to have assent from the Board of Regents*. We recommend that the dean be allowed to request funds and allocate resources on the basis of program categories. He would receive a certain amount of funds from the *upper level decision makers* which would be allocated to programs, i.e., $205,000 for the College of Business's lower level program, $750,000 for the College of Business's upper level program and $550,000 for the College of Business's graduate program. He would decide on the basis of substantiated departmental needs, how much of the money in each category should be allocated to each department in each sub-program, e.g., the upper level program in accounting which yields a BBA in accounting, the lower level program in

General Business, etc. When he allocates money to these organizational units he will have information from the system about where this money will *actually* have an impact. This process will become clearer after reading the section of this report which deals with program budgeting.

Each of the program budget-categories such as "Upper-Level – School of Business" would be substantiated by contributions to individual program-packages (there are over 500 at UGA) such as BBA – Accounting.

Vice Presidential (Cabinet) Level

The integrated system of PPB described earlier should become the basis of decentralized decision making. It is naturally sheer nonsense to have decisions made on the operating level which involve University policy. On the top level, therefore, criteria must be clearly formulated to enable the operating level managers to make decisions within the prescribed policy framework. Strategic planning is unquestionably in the realm of the top administration. Departmental and school planning must be presented in a documented form to allow the top level to make use of operating level planning in their preparation of annual planning decisions (budget and long-range plan). The cabinet level considers all needs in the strategic interplay for phasing in and out structural and operative needs. Especially on the levels of the top administration, the implications of each program and subprogram must be expressed in clear terms and where possible in quantitative denominators.

Part III

The End Products of the Fully Implemented PPB System in Systems Terms

In this section discussion will center on the *three* systems to be integrated into a single interconnected and interdependent system which is dependent on the information flow coming from an Information System (MIS) with the capability to be steadily improved. These three systems conform to the letters of the acronym PPBS:

A. A planning system,

B. A program structure, and

C. A budgeting system.

In discussing these three systems the stress is on:

1. Definition,

2. Progress by June, 1973, (termination date of the Ford grant)

3. Tasks remaining.

The concluding portion details a time versus task chart with respect to implementation of the System.

A. A Planning System

1. The emphasis here is on *planning systems* and not plans per se. Plans tend to be rigid and become rapidly outdated. A planning system by contrast is flexible and thus is not dated by the time the planning process is initiated. A planning system focuses on objectives, i.e.;

a. What is to be done.

b. How much is to be done.

c. By what methods and stages,

d. What resources are required.

e. How are the results to be *measured and evaluated*.

In dealing with these objectives "planning structures" have to be created which will depend upon the level on which such planning takes place – strategic planning emphasized on the top-level of the administration, operational and short term planning be emphasized on the departmental level, gravity planning (taking linear relationships into consideration such as increase in population, inflation etc) and analytical planning (taking specific non-recurring variables under the magnifying glass) on all levels.

The individual components of the planning system, *i.e.*, the items to be planned in PPBS, deal with the program structure and the resources that are grouped by the program components. The above questions must be asked and answered for each program level. The flexibility in the planning system arises as the components of the program structure are phased in and out as the needs of the situation dictate.

2. *Appraisal of progress by June,* 1973 termination date. The following aspects of the planning system will be completed:

a. A full statement of objectives for student-related programs will be available.

b. Criteria to measure the accomplishment of program objectives will be devised.

c. The statement of program objectives and criteria on each level will have been made compatible with higher level objectives and criteria.

d. Preliminary methods of analysis, for alternative inputs (cost effectiveness of alternatives weighed and adjudged – initially through very simple models) will be established. Cost benefit indicators for each program will be established in dollars and/or judgmental terms. The Project Team especially believes that models should not be re-invented but successful development of models by NCHEMS at WICHE and by other centers of excellence such as Ohio State University should be adapted to UGA requirements.

e. Criteria will be established

(1) For program evaluation,

(2) To conform to University policies

(3) For program priority decisions.

3.*Tasks Remaining After Project Termination*. The following tasks are meant to be completed after the project grant terminates:

a. *Refinement of the criteria* by which accomplishment of program objectives are measured to include:

(1) *Cost benefit and cost effectiveness analysis* for each program and its components.

(2) *Full use of societal indicators* to reveal the needs and benefits accruing from each program.

(3) *Application of costing and simulation techniques* to measure the benefits of higher education by specific programs.

b. Continuous revision, updating, and integration of objectives at "all levels" of the program structure. Course and project objectives are at one end of the continuum while the goals and objectives of the University System and of the State are at the other end.

c. Reform of the curriculum so as to:

(1) Eliminate duplication of courses in major fields.

(2) To insure that students in each major field are taking appropriate courses based on faculty judgement and other evidence. The Project Team has listed the above as tasks remaining after the grant expiration date – June, 1973 – but attempts will be made to plow into these tasks until the expiration date. There seems to be no reason why priorities should not be changeable.

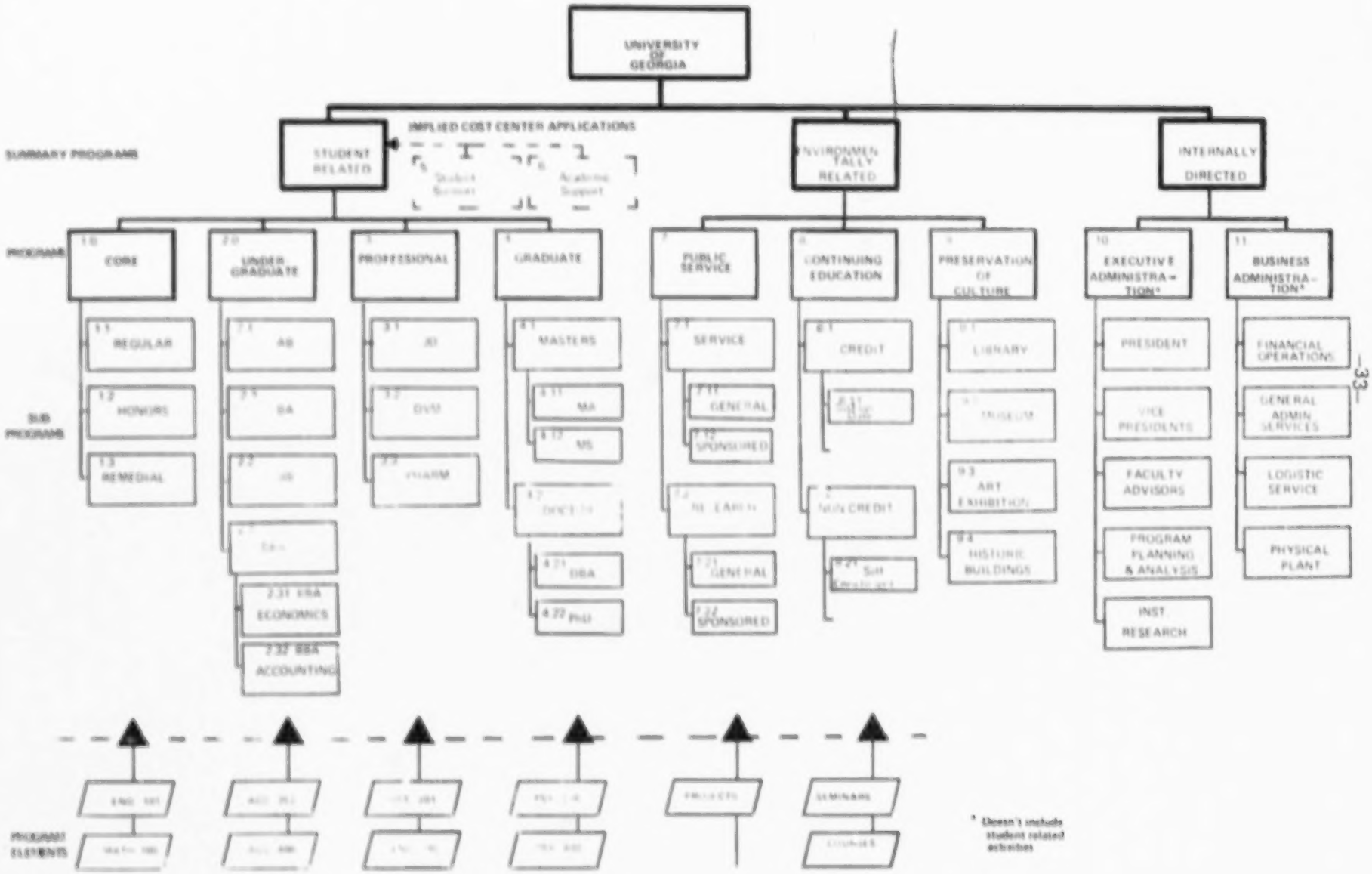
B. A Program Structure

The development and acceptance of a program structure for the University of Georgia adaptable for all levels and units of higher education is of central importance to the PPBS project. As emphasized above the components of the program structure are the items to be planned in the planning system. Additionally, program budgeting hinges upon the development of programs and their subsystems.

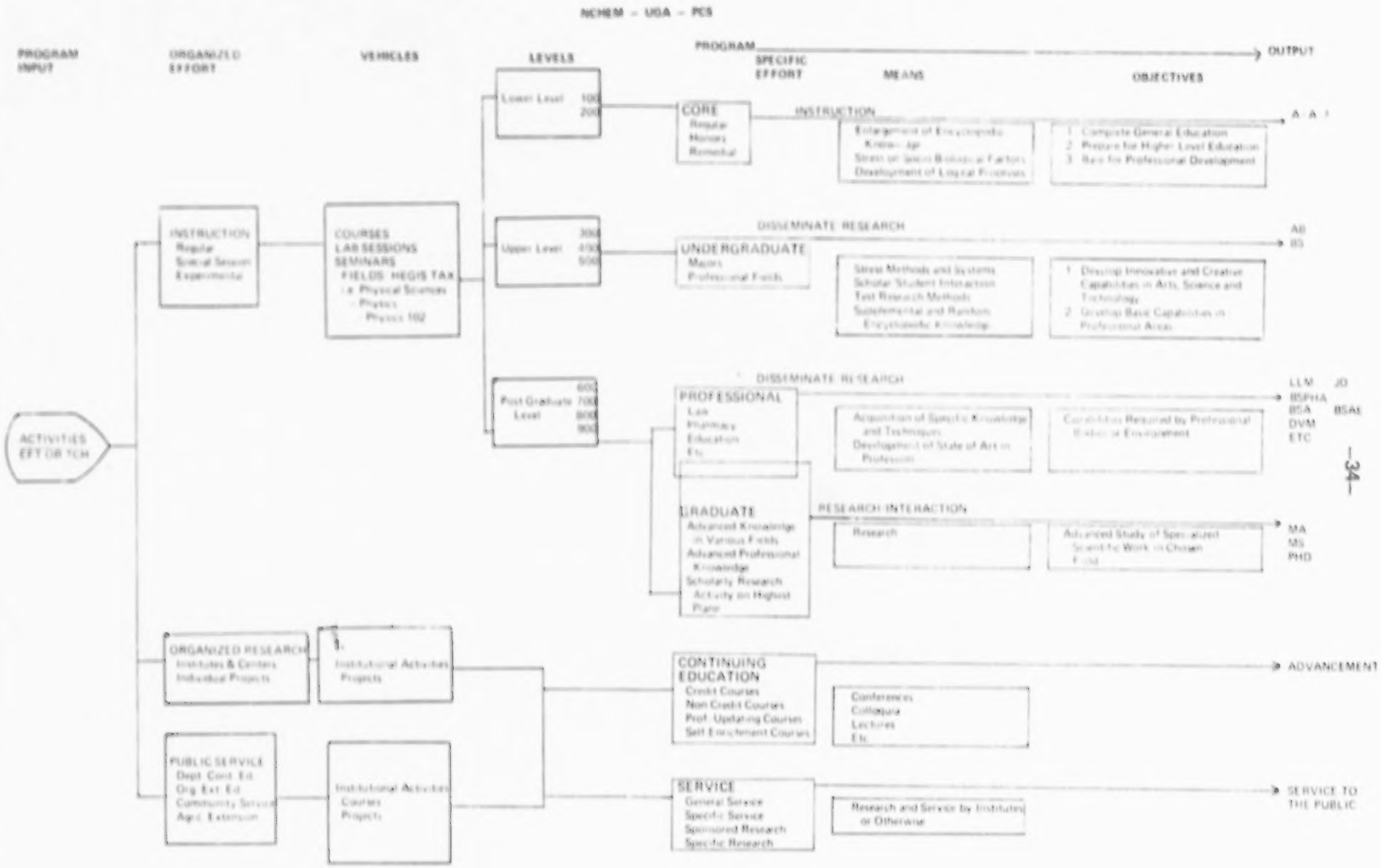
The program structure and its coding substructure are depicted in Illustration I and exhihited on the next page. A different program-structure and coding scheme has been devised by NCHEMS at WICHE. To reveal the simple compatibiltiy of the latter with the UGA structure a diagram is exhibited on page 34. Furthermore a paper entitled "The Concept of a Program Structure – An Alternative to NCHEMS PCS" is appended.

The differences in the development of the two Program Structures is due to semantic disagreemtn. In our program structure we define a program "as a political acceptable grouping of activities to meet defined objectives" and we limit such objectives to *final* outputs. In this we *conform to The Hegis Taxonomy* which addresses itself principally to degree programs rather than to the NCHEMS-PCS "Instruction Programs". NCHEMS defines a "Program" to be a collection of program elements serving a common set of objectives". Such a broad definition allows itself to be applied to managerial and/or organizational units, or processes, where objectives can also be established, the importance of which – delineating intermediate outputs – is not in question here.

UGA PROGRAM STRUCTURE



* Doesn't include student related activities


NCHEM – UDA – PCS
PROGRAM INPUT
ORGANIZED EFFORT
VEHICLES
LEVELS
PROGRAM
SPECIFIC EFFORT
MEANS
OBJECTIVES
OUTPUT
ACTIVITIES EFFORTS
INSTRUCTION
Regular
Special Session
Experimental
COURSES
LAB SESSIONS
SEMINARS
FIELDS REGISTRA
Physical Sciences
Physics
Physics 102
Lower Level
Upper Level
Post Graduate Level
CORE
Regular
Honors
Remedial
INSTRUCTION
Enlargement of Encyclopedic Knowledge
Stress on Socio Biological Factors
Development of Logical Processes
1 Complete General Education
2 Prepare for Higher Level Education
3 Base for Professional Development
A A
UNDERGRADUATE
Majors
Professional Fields
DISSEMINATE RESEARCH
Stress Methods and Systems
Scholar Student Interaction
Test Research Methods
Supplemental and Random Encyclopedic Knowledge
1 Develop Innovative and Creative Capabilities in Arts, Science and Technology
2 Develop Basic Capabilities in Professional Areas
AB
BS
PROFESSIONAL
Law
Pharmacy
Education
Etc
DISSEMINATE RESEARCH
Acquisition of Specific Knowledge and Techniques
Development of State of Art in Profession
Competencies Required by Professional Behavior Environment
LLM
JD
BSPHA
BSA
BSAE
DVM
ETC
GRADUATE
Advanced Knowledge in Various Fields
Advanced Professional Knowledge
Scholarly Research Activity on Highest Plane
RESEARCH INTERACTION
Research
Advanced Study of Specialized Scientific Work in Chosen Field
MA
MS
PHD
ORGANIZED RESEARCH
Institutes & Centers
Individual Projects
Institutional Activities
Projects
CONTINUING EDUCATION
Credit Courses
Non Credit Courses
Prof. Updating Courses
Self Enrichment Courses
Conferences
Colloquia
Lectures
Etc
ADVANCEMENT
PUBLIC SERVICE
Dept Cont Ed
Org Ext Ed
Community Service
Agric Extension
Institutional Activities
Courses
Projects
SERVICE
General Service
Specific Service
Sponsored Research
Specific Research
Research and Service by Institutes or Otherwise
SERVICE TO THE PUBLIC

Thus it will be understood that the proposed programs and subprograms for UGA are not identical to existing organizational units. For example, the Political Science Department contributes to at least four programs: the lower level, undergraduate, graduate, and service programs and to many scores of subprograms. Whereas the existing organizational structure is vertical, the program structure is horizontal.

Programs \ Org. Units	School A		School B	
	Dept. 1	Dept. 2	Dept. 1	Dept. 2
Core				
Undergraduate				
Graduate				
Professional				

2. *Progress by June, 1973.* By grant termination date the following aspects of the program structure are expected to be completed:

a. a fully developed program structure with specified subdivisions, reviewed, and accepted by the deans and department heads, coded for computerized storage and retrieval. Instructional program elements, i.e., courses required and taken will be specified through construction of "look up tables". The average number of student credit hours (SCH) and teacher contact hours (TCH) will be indicated as well as the impact of student migration.

b. The contribution of each department by level to the programs and subprograms will be specified.

3. *Tasks to be Completed After June, 73*

The tasks to be completed after the grant terminates are

a. Possible refinement of the program structure

b. Consideration by the administration of the impact of the integrated PPB system on existing organization structure. Possible consideration, for example, of the Ohio State University organizational structure in the light of their integration of a PPB system within organizational lines.

C. Budgeting

1. Definition Program budgeting emphasizes the allocation of resources to programs and subprograms rather than to organizational units and subunits. Before program budgeting is feasible, agreement must be reached on the precise nature of the program structure. *Since the University is presently not organized along program lines, successful program budgeting would require information as to how each organizational unit serves the various programs and the allocation of resources based upon this information.* Program budgeting and line-item budgeting *are not dichotomous, but complementary. The manager of any unit manages his line items to accomplish his unit's objectives. He in* . . . reports in program categories to the next higher level. This reporting process eventually is summarized at the president's level in the following format:

President's Budget	B_c	Y_1	Y_c *
1. Student Related Programs			
2. Environmentally Related Programs			
3. Inwardly Directed Programs			
A. Line Items, President's Office			
Salaries			
Travel			
Operating Expenses			
ETC			
TOTAL UGA BUDGET			

*B_c = Current Budgeted Figures
Y_1 = Last year's expenditure
Y_c = Current year's expenditure

As projectory information becomes more accessible, the budgeting time frame is envisioned to be expanded. In an University environment, three normal time spans become important:

a. the lower level – 2 years from entrance – bringing planning into focus with junior colleges.

b. the upper level – 3-4 years from entrance – planning and budgeting for an undergraduate output.

c. the graduate (and possibly professional) level – 5 to 8 years from entrance – planning and budgeting for an output of masters, Ph.D's and possibly professionals.

The above Program-Budget Format is expanded for school-levels. On the departmental level it is proposed to use a budget-format as shown on page 10 of the appended cost-concepts paper.

In conceptualization and application the Project Team has stressed that program budgeting is in direct contrast to incremental budgeting by organization units. Under program budgeting the budget is a financial statement of resources devoted toward accomplishment of the objective(s) of the program. As few program objectives are accomplished within a fiscal year, program budgeting must also consider resource commitments to the program over a period of years. Additionally, these resource commitments must be justified in terms of how they contribute to achievement of the objectives. Incremental budgeting by contrast is for a fiscal year or biennial period and justification is usually required only for the incremental increase in the budget and not for the total volume of resources.

2. *Progress by June, 1973*

It is anticipated that by grant termination date the following will have been accomplished:

a. Program budgeting will have been implemented in the instructional areas of selected schools, critiqued, and ready for implementation in all instructional areas of the University of Georgia. The extent of implementation in the research and service areas will depend upon successful refinement of the program structures for these areas; Research and Service Data Element Dictionaries have been developed to pave the road in that direction.

b. Indicative costs for each program will have been developed,

c. Indicative costs of program contributions by organizational units will have been developed,

d. Suggested changes in budgetary formats will have been presented.

3. *Tasks Remaining After June, 1973*

The tasks to be completed after the grant terminates are as follows:

a. Extension of program budgeting into the areas not previously implemented;

b. Continuous review and revision of the program budget estimates,

c. Implementation of the long-range program budgeting cycle.

D. Time phasing of the actions required to accomplish the tasks necessary by grant termination date are shown on the following time schedule.

TIME PHASING OF MAJOR TASKS

February, 1972	May, 1972	July, 1972	Fall, 1972	Winter/Spring, 1973	July, 1973
1. Check forms in Journalism School	1. Resource Advisory Review of Program structure	1. Start Program Budget Cycle in selected schools	1. Update manpower estimates Update alumni study	1. Evaluation of test implementation	1. Start program budget cycle for all schools
2. Program course Major Field Matrix	2. Modify forms and procedures Print forms	2. Start integration of support areas into program structure.	2. Prepare briefing and training sessions for remaining schools	2. Start Long-Range Program Budgeting Cycle for all schools	
	3. Run CMF for Spring Quarter	3. Computer Programs for Processing PADS, PASS PAUS, COI		3. CMF Fall	
	4. Alumni Report written	4. Write instructions manual for forms procedure and input information		4. CMF Winter	
	5. Manpower Report written			5. CMF Spring	
	6. Program Structure codings finalized				
	7. Cost Procedures manual reviewed				

PART IV

Cost Estimates and Manpower Requirements

Cost of designing and implementing a PPB System at the University of Georgia are difficult to estimate. *No higher education institution has implemented PPBS for comparative purposes.* There are indications that in the industrial sector between 1% and 2% of total sales is required for the initial design and implementation of MIS.[5] To use such industrial estimates at UGA, design and implementation costs would range betwee $900,000 and $1,800,000.

Costs for generating the information at the departmental level are estimated to total $137,500 for all academic departments, or about $1,100 for each of the 123 UGA academic departments.

These costs are primarily $900 in faculty and department head time required to complete the information forms and $200for clerical and keypunching. A cursory review indicates that the cost of information for support units and institutes would be approximately equal to this figure. Adding to this, the outlay for the PPB Project Team and the computer cost associated with the system work of the Project Team, a total estimate can be itemized as follows:

approximate cost incurred by academic departments	$ 137,500
approximate cost incurred by support units and institutes	137,500
Three year cost of PPB office	455,000
Computer cost emanating from PPB office	270,000

We must stress that in these estimates, we have insufficient means of documentation and especially, at this stage, the figure for costs of support units is only a guess. However, to further detail cost on the departmental level (academic), the following is the back-up of estimates:

Estimates as to requirements for specialized technical personnel outside the project team are as follows:

1. Computer Programmer

a. Program Attributes File — Four Man Months

1) course master
2) research projects
3) service projects
4) coding program structure

b.	Program Budget Information	Five Man Months
	1) Program Activity Department Summary	
	2) Program Activity School Summary	
	3) Program Activity University Summary	
c.	Course-Major Field Matrix	Two Man Months
	TOTAL	Eleven Man Months
2.	Resource Advisory Committee	Three Man Months

The above estimated costs refer to cost of generating data, not to computer output; it is assumed whoever will be responsible for the computer support, must estimate the cost. The Project Team also realizes the reliability of the time span estimates can be questioned! Any difficulty in communication outside the PPBS Team can cause a variety of serious delays!

The University of Georgia Self-Study has estimated current operational cost of the existing University of Georgia Information System as $48.00 per student or $960,000 per annum; the question has been posed what components within the present existing system will be terminated as a result of the integration through the system under development.

At this stage the impact of PPBS and the material benefits of the melding with the existing system are difficult to express in measurable terms.

Relevant information for decision makers is presently stored in data files that are incompatible; e.g., at present it is impossible to link instructors to courses to dollars since (1) the data on courses are under the control of the registrar and on his data base; (2) the information on instructors is not centralized except for the faculty activities report and as a spin off from the space utilization system under the control of Office of Campus Planning; and (3) salary information is maintained not only in a separate payroll file but in a separate computer center under the control of the Vice President for Business and Finance.

The data bases and the software to operate them have grown independently of one another. No complete systems design has been attempted. The result has been that of a fragmented, autonomous, non-connected series of "systems" designed to produce reports of value to a single office. Implementation of PPBS will link these "systems" into a system of information to serve decision-makers at all levels of the University, rather than one administrative office. As the present "system" includes duplication and overlap as well as blind alleys, the existing "systems" can be incorporated into PPBS and PPBS need not be an "additional" operating expense. The additional expense in PPBS occurs in the design and implementation, not in operating expenses.

It seems reasonable to assume that the operational cost of the linking of systems, which PPBS to a certain degree should accomplish, and which are indicated in the self study to be $48.00 per student, would decrease and that except in the initial stages of PPB implementation, no additional cost should be incurred.

That assumption gains credibility when comparing national operating costs per student. According to Leo Kornfield[6] such costs are:

The Ohio State University	$10/student
University of Utah	$30/student
University of Illinois	$60/student

The above figures seem to be inflated as they include computer rental — for Utah about $10.00. We have no knowledge how much of UGA operating cost of $48/student is rental.

In addition to the $1,000,000 figure for design and implementation, the Project Team estimates that an annual cost of $30 per student will be required to operate the system. This figure includes released time for updating of information, specialized manpower to analyze the data, computer time and manpower to update the files, and special studies designed to improve the data base.

FOOTNOTES

1. Elmer B. Staate: *Issues Facing Financial Managers in the Seventies*; in Federal Accountant – Arlington, Va., September 1971, p.7, "Perhaps one reason for the slowdown is the 'top to bottom' approach that was originally used for PPB."

2. NCHEM at WICHE has made considerable advances in connection with the Course-Major-Field Matrix. However, while applying and using extensively techniques indicated in the NCHEM RRPM, the UGA Matrix Development has significantly different aspects.

3. The schematic depicting student flow at The University of Georgia has been modeled to UGA specification from a model developed by G. W. Baughman of Ohio State University. (*Colloquim*,) April 25, 1970. Institute of Long Range Planning, University of Pittsburgh.

4. *Zero-Budgeting* uses very similar forms and has a very similar approach: PPBS goes, however, much further. Further more, zero-budgeting has not yet been applied in Georgia to the academic area.

5. Leonard I. Kraue; *Computer Based Management System*; Monograph American Management Association – 1970, pp. 35-36.

6. Leo Kornfield; Three University Case Studies show varying levels of sophistication with all systems go for MIS; *College & University Business – Managing Information*, March, 1971.

GLOSSARY

Term	Description
ACCOUNTING SYSTEM	An organization of forms, records and reports, closely co-ordinated to facilitate financial management through determining basic and required information. See Costing System.
ACCRUAL BASIS OF ACCOUNTING	That method of recording transactions by which revenues and expenses are reflected in the accounts in the period in which they are considered to have been earned and incurred, respectively, whether or not such transactions have been finally settled by the receipt or payment of cash or its equivalent.
ACCRUED EXPENSE	An expense which has been incurred in an accounting period but for which no enforceable claim will be made in that accounting period by the person who rendered the service. It arises from the purchase of services (including the use of money) which have been only partly performed at the time of accounting and hence are not yet billed or paid for.
ACTIVITY	Expresses the organized motions to achieve the objectives, purposes and/or goals of a program or groups of programs, i.e., instructional activities, research activities, service activities. The intertwined activities represent the process which produces outputs.
AIM	The directing of effort toward an object in order to affect it. Direction or guidance as to the course or procedure to be followed. The object intended to be attained.
ALGORITHM	A set of ordered procedures, steps, or rules, usually applied to mathematical procedures, and assumed to lead to the solution of a problem in a finite number of steps. A familiar algorithm is the process of finding a square root—a process in which various steps are repeated until a satisfactory solution is obtained.
ALLOTTMENT PROCEDURE	A procedure designed to distribute within a governmental environment appropriated funds among or within governmental agencies and thus allow various governmental units to incurr obligations up to the amounts allotted. See Apportionment.

ALTERNATIVES	Within any one organizational unit, this term means other possible programs besides those already decided upon. It suggests a comparison of two or more programs (i.e. two or more possible approaches) toward fulfilling the same objective. Used in this context the term is output-oriented; it suggests substituting an entirely different program (and therefore a different output or outputs) for a program already planned or in process. On the other hand, alternative ways to do a given job takes the program as given, and raises possibilities for changing the mix of inputs.
ANCHOR CHART	Visual expression of system or process on which the ensuing discussion is based.
APPORTIONMENT	A specific method of allottments made by the Budget Office of amounts available for obligation and expenditure in an appropriation or fund account into amounts available for specified time periods, activities, functions, projects, and objects, or combinations thereof. The amounts so apportioned limit the obligations to be incurred or, when so specified, expendtures to be accrued.
APPROPRIATION	Is a legislative authorization to allow the Executive Branch of government and its subdivisions (agencies) to incur obligations and to spend moneys stated in specified amounts, for specified purposes and during the time spans stated in the appropriation acts.
ATTRIBUTE	A quality. Sampling for attributes is a sampling where each unit is found either to have or to lack some characteristic. This is contrasted with sampling for variables, where a numeric measurement is recorded for each item. In sampling for attributes the objective is to estimate the number of times a characteristic occurs in a population, often expressed as a percentage of the total.
AUTHORIZATION	An Act of Congress or of other legislative bodies (state or municipal) which authorizes programs, obligations, or expenditures. The term sometimes refers to basic substantive legislation setting up a program or an agency, and authorizing appropriations to be made for them, but not actually providing authority to spend. See also: Appropriation.

BENEFIT-COST RATIO	An economic indicator computed by dividing output benefits by costs. Usually, both the annualized benefit stream and the cost stream are discounted so that the ratio reflected is in terms of the present value of future benfits and costs.
BUDGET	A financial plan serving as a pattern for and control over future operations; hence, any estimate of future costs; any systematic plan for the utilization of manpower, material, or other resources. The term "budget" also refers to the summary totals of appropriation, receipts, expenditures (excluding net lending), expenditure account surplus or deficit, gross and net lending, total expenditures, and total budget surplus or deficit. A unified summary budget statement replaced the three (Administrative Budget, Consolidated Cash Budget, National Income Accounts Budget) or more competing budget concepts on the national level in the fiscal year 1969 budget submitted to the Congress in January 1968.
BUDGETING	In a PPB System, budgeting is the process of translating planning and programming decisions into specific projected financial plans for periods of time. Budgets can be short-range segments of action programs adopted which set out planned accomplishments and estimate the resources to be applied for the budget periods in order to attain those accomplishments or can be the vehicle for long range planning. Budgeting is a method of forecasting estimated expenditures and expected revenues and relating both to each other during a stated fiscal period. See Budgeting Time Span, Line Item Budgeting, Incremental Budgeting, Program Budgeting, Cost Based Budgets, Zero Budgeting, Formula Budgeting.
BUDGETING SYSTEM	Integrating the annual or biannual budgeting process into a longterm, systematically arranged plan.
BUDGETING TIME SPAN	Governmental and private sector budgeting is for a one year period, however bi-annual budgeting is not unusual in state governments. Program budgeting takes an even longer time frame into consideration.

CABINET LEVEL	A level of decision-making in a university comprised of the president and his vice presidents.
CONTACT HOURS	The actual time of contact of student and teacher in class, lab, or other organized activity. See SCH, TCH.
COST APPLICATIONS	Associating costs with program elements, activities processes and/or outputs. Dollar value need not represent actual cash outlays.
COST BASED BUDGETS	Budgets in which activity levels are measured in terms of value of resources consumed in carrying out the activity, rather than in terms of obligations (q.v.) incurred. These resource requirements, when distributed to program elements and categories and time phased to obligation requirements can provide a cost basis for PPB.
COST-BENEFIT ANALYS (BENEFIT-COST ANALYS	A simplistic analytical approach to solving problems of choice which requires the definition of objectives and identification of the alternative that yields the greatest benefits for any given cost, or that yields a required or chosen amount of benefits for the least cost. The term usually applies to situations in which the alternative outputs can be quantified in dollars. A chief characteristic of cost-benefit analysis is that its aim is to calculate the present value of benefits and costs, subject to specified constraints. See also: Cost-effectiveness analysis.
COST-BENEFIT INDICATORS	Refers to quantitative measures and as proxies for true cost-benefit ratios. Necessary due to the difficulty and cost of generating a precise measure of benefits from higher education institutions in dollar terms.
COST CENTER	A unit, group, or subdivision of an organization or process, used to segregate and distribute expenditures incurred to support a principal purpose.
COST CURVE	A graphical representation of the relationship of cost to another variable, such as output. It is conventional to construct these curves with costs along the vertical axis and the related variable along the horizontal axis.

COST EFFECTIVENESS	Cost relationship between input and output alternatives for a given set of objectives.
COST-EFFECTIVENESS ANALYSIS	An analytical approach to solving problems of choice which requires the definition of objectives, identification of alternative ways of achieving the objective, and identification of the alternative that yields the greatest effectiveness for any given cost, or what amounts to the same thing, that yields a required or chosen degree of effectiveness for the least cost. The term is usually used in situations in which the alternative outputs cannot be easily quantified in dollars. See also: Cost-Benefit Analysis.
COST ESTIMATING RELATIONSHIP (CER)	Any numerical relationship which is useful in computing estimated costs of materials or activities. These relationships range from simple averages and percentages to compex equations derived by regression analysis (q.v.) which relate cost(dependent variable) to physical and performance characteristics (independent variables).
COST INDICATORS	Index numbers used as a short cut in estimating cost. Index numbers are indicators of change from one point or period of time to another. Ordinarily they are used in cost estimating in a composite of a number of elements of cost.
COSTING PRINCIPLES	A set of principles especially developed for cost applications of a PPB framework at the University of Georgia.
COSTING SYSTEM	One aspect of the accounting system as a whole, designed specifically to provide information concerning cost and effectiveness. See Accounting System.
COSTING TECHNIQUES	See Costing Principles.
COURSE MASTER FILE	A listing of all courses approved to be taught.
COURSE-MAJOR FIELD MATRIX	A matrix with one axis labeled with courses taught by department and the other the institutional major and degree categories. The matrix is used to accumulate, display, and provide the basis of analysis for student flows and for program contributions by departments.

COURSE OBJECTIVE INVENTORY	The name of a form developed by the University of Georgia designed to be completed by the faculty member. Primary use is in specifying desired changes in students as a result of the course.
COURSE "STANDARD COST"	A method to be introduced by which standards will be developed for cost of courses based on historical information and the knowledge of variables, i.e. type of teacher, faculty/student ratio, etc.
COURSES TAUGHT FILE	A computer based file of courses currently taught by the institution – based upon the compilation of courses taught during the past three years and approved new courses. In contrast to an approved course listing file.
CPM AND PERT	CPM (Critical Path Method) and PERT (Program Evaluation and Review Technique) are network analysis models. Each has its own modeling language, but they differ in only one fundamental respect: CPM seeks to determine the expected times of completion of the total project and times of completion of the subprojects of which it is composed. PERT goes further and seeks to estimate variances associated with these expected times of completion. The importance lays in scheduling which reveals the critical path where delays will effect outcomes and cost.
CRITERIA	Premises on which priorities are established among alternatives in order to measure relative degrees of desirability. In PPB literature often used as a synonym for measure of effectiveness.
CROSSWALK	The expression of the relationship between the program structure, and the accounting structure; it can be viewed also as a coding classification system bridging inputs, processes and outputs.
DATA BANK	Usually referring to data stored in the various storage facilities of computers.
DATA ELEMENTS	A classification structure defining individual components of a data base as developed by NCHEMS at WICHE and by the PPB group at the University of Georgia.

DATA FILES	Files for specific purposes, i.e. registration, developed and stored within an information system. The term is usually referring to a computerized storage system.
DECISION VARIABLE	A variable over which one can exert some control, the value of which one can choose as a result of a decision. The decision variable might be the amount of food one must eat to satisfy hunger. If the relationship between the values of the decision variable and the level of goal attainment can be defined, one can then find the value of the decision variable that maximizes the attainment of the goal.
DEGREE MAJOR PROGRAM	A subunit of the program structure in the student related program grouping delineating both the degree and the major.
DEGREE OF OBJECTIVE ATTAINMENT	A method to measure quantitatively or judgmentally the attainment of an objective by setting a scale, i.e. high, average, low or having a scale of attainment from 1 to 9.
DEMAND	Means "demand schedule" which is the relationship between price and quantity demanded. The demand schedule expresses how much of the good or service would be bought at various prices at a particular point in time.
DEPARTMENTAL ACTIVITIES	Are those listed in the faculty activity report. See Faculty Activity Report.
DEPARTMENTAL PROGRAM REQUIREMENT FORMS	See Departmental Program Report.
DEPARTMENTAL PROGRAM REPORT	A form especially developed at the University of Georgia containing information of activities, attributes, quantitative measures and resource requirements of individual instructional programs.
DETERMINISTIC MODEL	A model in which variables can only take on known values, i.e., a model that does not permit any uncertainty as to the size of inputs or outputs. For example, a set of simultaneous equations for which there is a unique solution. See also: Probabilistic Model, Simulation.
DIMINISHING MARGINAL UTILITY	The principle that, as the rate of consumption of a good is increased, a point is reached whereafter additional units provide less and less utility.

DIMINISHING RETURNS (VARIABLE PROPORTIONS) — LAW OF	The economic principle that, as there is an increase in the quantity of any variable input which is combined with a fixed quantity of other inputs, the marginal productivity of the variable input must eventually decline. For example, additions of capital to a fixed quantity of labor may result in an increase in output, but subsequently the marginal output and then the average output associated with the variable input (capital) will begin to drop.
ECONOMIC EFFICIENCY	That mix of alternative factors of production (resources, activities, programs, etc.) which results in maximum outputs, benefits, or utility for a given cost; alternatively, it represents the minimum cost at which a specified level of output can be maintained.
ECONOMIES OF SCALE	Factors that reduce average production costs as the size of a plant increases. Economies of scale may be classified either as (1) internal, resulting from the increased size of an individual firm, or (2) external, resulting from the increased size of an industry as a whole.
EFFECTIVENESS	The performance received from an aproach or a program. Ideally, it is a quantitative measure which can be used to evaluate the level of performance in relation to some standard, set of criteria, or end objective.
EFT	Equivalent of full time to be applied to partime students and faculty employed for an academic year or less, rather then a full fiscal year – often referred to as FTE or man-years.
EFT INPUT	Referred to in a university system as equivalent full time input of faculty and staff. See EFT.
ENVIRONMENTALLY RELATED PROGRAMS	The summary program in the UGA program structure that has, as outputs, impacts upon the community, state, region, and/or nation or on special subunits or sectors thereof. Contrast with student related programs and inwardly directed programs. It contains principally research and service programs.
EXPENDITURES	Any outlay incurred or accrued. See: Accrued Expenditures.

FACULTY ACTIVITY REPORT	Forms developed in which faculty members account for various activities performed such as instruction, research, service, administration, etc.
FORMULA BUDGETING	A procedure prevalent in higher education budget determination of estimating future budgetary requirements through manipulation of objective quantitative data about programs and relationships between programs and costs.
GOAL	Terminal point; the end toward which effort or ambition is directed. A condition or state to be brought about through a course of action.
GRAVITY PLANNING	A pictorial expression of planning of expected growth, (e.g. of population, or inflation). It also could be described as linear or regression planning.
GROSS NATIONAL PRODUCT (GNP)	The total market value of all final goods and services produced in the Nation in one year.
HEGIS TAXONOMY	A classification of instructional disciplines and academic subdivisions of knowledge and training as published by the National Center for Educational Statistics.
HEURISTIC	Solution of a problem by a trial and error approach frequently involving the act of learning, and often leading to further discovery or conclusions without providing proof of the correctness of the outcome.
INCREMENTAL BUDGETING	See Incremental Cost.
INCREMENTAL COST	The increments decided by incremental analysis, associated with change in the level or output.
INDUSTRIAL COSTING	Refers to costing methods applied in industry.
INFORMATION FLOW	The process by which data is converted into information and sent to the user of the information.
INFORMATION SYSTEM	A aggregation of facts organized so that data for general or specific needs can be made appropriately available. See MIS.

INSTITUTIONAL RESEARCH	Concentrates on probing deeply into the working of institutions of higher education for evidence of weaknesses or flaws which interfere with the attainment of the institution's purposes and the best utilization of resources.
INSTRUCTIONAL PROGRAM ELEMENTS	In connotation with a PPB System in Higher Education, an individual teaching and/or laboratory session is depicted as a program-element.
INWARDLY DIRECTED PROGRAMS	A summary program of the UGA program structure containing programs specific to the physical existence of the University itself.
ITERATIVE PROCESS	A process for calculating a desired result by means of a repeating cycle of operations, which comes closer and closer to the desired result.
JOB DESCRIPTION	This is a carefully thought-out written description of a job, showing what it involves, how it is to be done, what are its responsibilities, duties etc.
LINEAR PROGRAMMING	A deterministic model (q.v.) which assumes linear behavioral relationships and in which an optimal solution is sought (maximizing or minimizing) subject to one or more limiting constraints. Linear programming is used to determine the best or optimum use of resources to achieve a desired result when the limitations on the resources can be expressed by simultaneous linear equations. Every solution has a primal and a dual aspect, that is, a solution maximizing something (primal) as well as minimizing something (dual). The solution first sought is usually the primal, regardless of the objective of the analysis. See Gravity Planning.
LINE ITEM	Also called object of expenditure – is a classification of expenditure for goods and services purchased (and or moneys transferred to persons or groups; i.e. student support).
LINE ITEM BUDGETING	A budget method whereby allotments are based on line-items. See Line Items.

LEARNING (OR PROGRESS) CURVE	A curve which describes the set of points conforming to the observed phenomenon that cost reductions yield a constant percentage decrease for each doubling of the cumulative quantity produced.
LONG RANGE BUDGETARY REQUEST	Requests for moneys over longer periods than the normal budget time span.
LOWER LEVEL	Refers to the freshman and sophomore years in institutions of higher education.
MANPOWER	(1) Personnel required to perform a given task; (2) the title of a study relating outputs of graduates in higher education by major discipline with available projected job openings.
MANPOWER INFORMATION	See Manpower, Manpower Planning, Manpower Requirement Report.
MANPOWER EDUCATION RELATIONSHIP	See Manpower Requirement Report.
MANPOWER PLANNING	In addition to normal replacement due to resignations and retirements, knowledge of how an organization will develop over the next few years should show approximately what new types of vacancies in what number will occur and which present job will be redundant. Some idea of the qualifications required for these jobs can be estimated and recruitment to meet the demand or training to meet the suply will be planned accordingly.
MANPOWER REQUIREMENT REPORT	An annual report containing indicators relating the availability of graduates and the labor market for each classification of degree majors.
MARGINAL ANALYSIS	The process of identifying the benefits or costs of alternative behaviors as unitary changes when the alternative variables occur and equalizing the benefit-cost ratios to form a point of indifference (trade-off) for decisionmaking purposes.
MARGINAL COST	In a marginal analysis (q.v.), the change in total cost due to a one unit change in output.
MARGINAL REVENUE	The change in total revenue due to a one unit change in output. See also: Marginal Cost.

MARGINAL UTILITY	The change in total utility due to a one unit change in the number of goods and services consumed. Marginal utility is a psychological rather than an objectively measurable concept.
MATRIX	An array of quantities into rows and columns, usually capable of being subject to a mathematical operation by means of an operator or another matrix according to prescribed rules.
MEANS	Resources available for disposal – anything employed in performing or executing some end.
MEDIUM	An intermediate means of conveyance or communication.
METHOD STUDY	Part of "work study." By systematically studying any job, it is possible to eliminate any part of it that does not contribute usefully, or improve the way it is done, or reduce the labor to do it. Usually includes Time Study, i.e. measuring the amount of work needed to complete a job.
MIS	Management Information System. An information system tailored for managment purposes. See Information System.
MODEL	A schematic representation of the relationships that define a situation under study. A model may be mathematical equations, computer programs, or any other type of representation, ranging from verbal statements to physical objects. Models permit the relatively simple manipulation of variables to determine how a process, object, or concept would behave in different situations. A *decision model* is a model, which, in effect, performs management's planning and control functions–to the extent that management delegates when the model is constructed and implemented.
NCHEMS	National Center for Higher Education Management Systems at WICHE. See WICHE.
NCHEMS COSTING AND SIMULATION TECHNIQUES	Refers to techniques and software developed by the National Center for Higher Education Management System for asking and answering "what if" questions in terms of cost. Examples of "what if" questions are

NCHEMS COSTING AND SIMULATION TECHNIQUES (CON'T)

(a) What if we increased the faculty workload 10%,
(b) What if we decreased class size to a maximum of 30 in this discipline,
(c) What if we change the faculty rank mix to add more full professors?

The techniques are used also in forecasting resource requirements for future time spans.

NCHEMS – PCS

Program Classification Structure developed by NCHEMS.

NCHEMS – RRPM

Resource Requirement Prediction Models developed by NCHEMS. See RRPM.

OBJECTIVES

Goals or results that the decisionmaker wants, or should want, to attain. Hence, the end product or output of a program.

OBJECTIVE FUNCTION

The measure of effectiveness used in linear programming models which is to be maximized or minimized. In Government agencies the objective may be minimization of costs or maximization of program output with given costs.

OBLIGATIONS

Obligations in Federal accounting represent commitments to acquire materials or services or to make payments under certain conditions (such as loans, grants, subsidies, and contributions).

OPERATING PROGRAM

Conceptually, a mix of activities and resources under common management which represents the most detailed organizational or budgetary level whose identification is required in the information system. The operating program may be identical with a program element if its purpose can be identified by only one program category.

OPERATIONS RESEARCH (OR)

The use of analytic methods adopted from mathematics and other disciplines for solving operational problems. Among the common techniques used in operations research are: linear programming, probability theory, information theory, Monte Carlo methods and queuing techniques. These methods are frequently used in PPB applications.

OPPORTUNITY COST	The measurable advantage foregone as a result of the rejection of the next best alternative use of resources. For example, foregone income of students by not being in the workforce.
ORGANIZATIONAL UNIT	An organized center to perform specified activities which has specified authorities and responsibilities. Such a unit can perform line or staff functions. In a university, schools and colleges are usually divided into departments which represent organizational units.
ORGANIZATION AND METHODS	The study of the best form of organization and methods to be used in a business. Much wider than "work study in the office", for it is concerned with such questions as who should receive what information. It is also concerned with: office equipment, printing, copying and duplicating, typing services, office layout, etc.
OUTPUT CATEGORY	A term categorizing the intermediate and/or finished products leaving a process.
PADS	Within the upwardly directed information flow at the University of Georgia, the acronym PADS stands for Program Activity Departmental Summary, e.g. program information to be accumulated on the departmental level.
PARAMETER	A value which is held constant during some calculation. The parameters of a system or model are characteristics, some of which may be assigned selected values while examining the effects of variation in other characteristics of the system.
PASS	Within the upwardly directed information flow at the University of Georgia, the acronym PASS stands for Program Activity School Summary to be generated on the Dean's or Director's level.
PAUS	Within the upwardly directed information flow at the University of Georgia, the acronym PAUS stands for Program Activity University Summary to be received on the Presidential level.
PERT	Program Evaluation and Review Technique. See: CPM.

PERFORMANCE BUDGET	A budget based upon functions, activities, and projects, whose principal analytical orientation is the measurement of efficiency of operating units. For example, such a budget might require computation of the cost per unit produced in an organizational unit.
PLANNING	The selection or identification of the overall, long-range objectives of the organization and the making of systems analyses of various possible courses of action in terms of relative costs and accomplishments or benefits in order to aid managers in deciding on courses of action (i.e. programs) to be followed in working toward achieving those objectives.
PLANNING–BUDGETING SYSTEM	Refers to specific planning and budgeting activities where the interconnection with programming is not fully accomplished.
PLANNING STRUCTURE	Refers to an emphasis of planning on different decision making levels, i.e. operational planning on the lowest level of the hierarchy and strategic planning on the higher levels.
PLANNING SYSTEM	An integral part of PPBS.
POPULATION	In statistics, the total collection from which a sample is to be drawn. Sometimes referred to as the universe.
PRESENT VALUE (NET PRESENT VALUE OR DISCOUNTED PRESENT VALUE)	The maximum amount that an investor could pay for or invest in a project without being financially worse off. The present value method of project evaluation requires the analyst to use an interest rate to discount future benefits and costs to the present.
PROBABILITY	The ratio of the number of outcomes that would produce a certain event to the total number of possible outcomes.
PROCESS	A technological or administrative grouping of activities directed toward intermediate or final outputs and organized in such a systematic manner that individual processes and their outputs become interconnected.
PRODUCTIVITY	Refers to a measured physical output of products divided by the measure of a resource input. See Productivity Measure.

PRODUCTIVITY MEASURE	A standard ratio of measurable output and utilized resources within an organizational unit.
PROFESSIONAL LEVELS	Levels in Higher Education directed toward the production of professionals, i.e. Medical Doctors, Pharmacists, Lawyers, etc.
PROGRAM	In the UGA concept it is defined as a politically acceptable grouping of activities to meet defined objectives. NCHEMS defines program as a collection of program elements serving a common set of objectives.
PROGRAM AND FINANCIAL PLAN (PFP)	As introduced into the U.S. Federal government, a multi-year budget forecast based on the program structure which projects the future (usually five years) outputs and cost implications of current decisions and shows comparative data for the fiscal year just past, the current year, and the budget year.
PROGRAM BUDGETS	Budgets expressed in terms of programs rather then organizational units, activities, or line items.
PROGRAM CATEGORY	A classification within a program structure. See Program Package.
PROGRAM CONTRIBUTION	Refers to the fact in Higher Education that program elements contribute to various programs, i.e. AB in History is composed of courses taught in many different organizational units.
PROGRAM–DEGREE MAJOR	See Degree Major Program.
PROGRAM ELEMENT	A subdivision of a program category which comprises the specific products that contribute to an objective. In Higher Education an individual instructional course or research and service projects are acknowledged Program Elements.
PROGRAM MANAGEMENT	Refers to the responsibility over a single program or a group of programs.
PROGRAMMING	Programming is the process of deciding on specific courses of action to be followed in carrying out planning decisions. It also refers to a means of giving instructions to a computer in order to produce a report or information.

PROGRAM PACKAGE	A grouping of program elements in a manner so that the grouping is relevant to decision-making (planning) for the accomplishment of stated objectives and is a subdivision of programs, i.e., a major in History is a subdivision of an AB program.
PROGRAM STRUCTURE (PCS)	Refers to a structure of programs in Higher Education. NCHEMS PCS has been developed on functional and activity lines, while UGA structure is based on final outputs, e.g. degrees.
PROJECT TEAM	The PPBS group at the University of Georgia funded by the Ford Foundation: The Office of Program Planning and Analysis.
PURPOSE	Something that one sets himself as an object to be attained. An end or aim to be kept in view in any plan, measure of exertion, or operation.
REGRESSION ANALYSIS	The association of one or more independent variables with a dependent variable. Under static conditions the analysis is called correlation. When used for predictive purposes, it is referred to as regression. The relationships are associative only; causative inferences are added subjectively by the analysts.
RESEARCH AND SERVICE FUNCTIONS	Groups of activities which serve mostly the environmentally related programs within a university.
RESEARCH DATA ELEMENT DICTIONARY (DED)	Refers to a DED developed by the UGA-PPBS Project Team.
RESOURCE REQUESTS	Refers to budgetary requests by departments and schools.
RESOURCE REQUIREMENT COSTING	A term especially created in developing the University of Georgia PPBS to emphasize a different costing methodology applicable to a state university.
RISK	"Measurable uncertainty" per the economist Frank Knight. In decision theory, the distinction is made that risk is measurable while uncertainty is not.
RRPM	Resource-Requirement Prediction Models: See NCHEMS RRPM.

SCALAR	A quantity having magnitude but no direction as contrasted with a vector which has both. A scalar is the multiplier by which multiples of a vector may be formed.
SCENARIO	A description of the environment of the problem area under analysis.
SCH	Abbreviation for Student Credit Hours, i.e. the hours a student receives credits for taking a certain number of courses. Can differ from Contact Hour.
SCH PRODUCTION	The number of Student Credit Hours produced in a particular discipline or course and during a specified calendar term.
SELECTED IMPLEMENTATION ATTEMPTS	Refers to implementation of PPBS at UGA in selected schools rather than across the board.
SERVICE (DED) DATA ELEMENT DICTIONARY	Refers to a Data Element Dictionary developed by the PPBS Project Team at UGA.
SIMULATION	An abstraction or simplification of a real world situation. Hence, in its broadest sense any model is a simulation, since it is designed to replicate some existential condition (s). Simulations may take the form of either deterministic models or probabilistic models.
SLOPE	The algebraic change in the dependent variable (y) per unit increase in the independent variable (x), as a point P, moves along the line.
SOCIETAL MEASURES	Measures of outputs in relation to societal needs, such as university graduates and reduction in crime.
SPACE INFORMATION	An information system for the purpose of space inventory and space utilization. Is of great importance in a university for distributing classroom and other space.
SPILLOVER	An economy or diseconomy for which no compensation is given (by the beneficiary) or received (by the loser). Spillover is sometimes synonymous with *externality* and with *external economy* or *external diseconomy*.
STATISTICAL INFERENCE	Using information contained in a sample to make predictions about a larger set, the population.

STATISTICAL METHOD OF COST ESTIMATING	A method of cost estimating utilizing statistically determined cost; estimating relationships which express cost as a function of the characteristics specified for the case in question. A valuable aspect of statistical estimating is that of providing an objective statement regarding cost uncertainty.
STAFF FUNCTIONS	Functions in support of line operations.
STANDARD COST	A scientific method of using predetermined cost for managerial purposes.
STUDENT CONTACT HOURS	See Contact Hours.
STUDENT EFT	See EFT.
STUDENT FACULTY RATIO (S/F RATIO)	The number of students taught in a specific class by one faculty member.
SUBOPTIMIZATION	Selection of the best alternative course of action which pertains to a subproblem, i.e., to only part of the overall problem or objective. Suboptimization is usually necessary because alternatives at all the various levels of decision making cannot, as a practical matter, be analyzed simultaneously before decisions are made at any level. Also referred to as any intermediate stage in a long-run goal attainment program.
SUB–PROGRAM	See Program Package.
SUBSYSTEM	A subclassification of an information system.
SYSTEMS ANALYST	An approach to make possible rational decisions as to the design, selection or operation of a system. Analysis seeks clear identification jointly of one best system and the most efficient way of operating it.
TARGET GROUP	A group within a universe toward which a program is aimed or on which it has a significant impact.
TCH	Teaching Contact Hour. See SCH.
TELEOLOGY	The fact or character of being directed toward an end or shaped by a purpose. The use of design (means) purpose utility as an explanation of a phenomenon.
TIME PHASING	A method of setting a certain activity in the time-frame of a process.

UNIVERSITY SYSTEM	Refers to the University System of Georgia comprised of 27 colleges and universities.
UPPER LEVEL	Refers to the Junior and Senior year in a university educational system.
UPWARD INFORMATION FLOW	The process by which information generated at one level in the organizational hierarchy proceeds in a smooth fashion to the higher levels in the hierarchy.
VARIABLE	A quantity that may increase or decrease depending upon the set of circumstances under which it operates.
VARIANCE	A measure of the variability of scores from the mean; a measure of dispersion of scores from the average score.
VECTOR	A quantity having magnitude and direction as contrasted with a scalar which has magnitude only. Vectors are described by a set of numbers, much the way a point on a map has coordinates. A crucial property of vectors is the "parallelogram law of combination." Vectors are important because a variety of things in science and mathematics have both magnitude and direction and combine according to the parallelogram law. See also: Matrix.
WICHE	Western Interstate Commission on Higher Education.
ZERO BASED BUDGETING	See Zero Budgeting.
ZERO BUDGETING	An organizationally based budgeting system in effect in the State of Georgia government requiring the operations to be subdivided, ranked by priorities, and alternatives.
ZERO BUDGETING IDEAL	The concept of Zero Budgeting stated by Peter Pyrrh in the *Harvard Business Review*, December, 1970, applied to support activities of a manufacturing operation.

PPBS DATA COLLECTION AND PROCESSING FORMS

UPDATE TO APPENDIX

IN

"UNIVERSITY OF GEORGIA

SYSTEM OF PROGRAM PLANNING & BUDGETING"

A.A. Sterns, Director

July 1972

Introduction

The set of forms reproduced in this document are replacements for the Preliminary Forms found in an earlier document titled "University of Georgia System of Program Planning and Budgeting".

In their present form the data collection forms are representative of a manual system. They will in the final design be computerized with much of the data being drawn from the MIS data files. The present structure displays the logic to be followed in data collection and processing.

This report is in three parts. The first part describes the purpose of each form. The second part is a display of each of the eleven forms. The third part – the last page – is a forms flow chart showing the information flow and the crossfoot checks designed into the data system.

DESCRIPTION AND PURPOSE

OF EACH FORM

PPBS FORMS NO.	DATE	PAGES	TITLE	PURPOSE
1	7-15-72	2	COURSE OBJECTIVE INVENTORY	To establish a primary record of objectives of each individual course as seen by *each* faculty member teaching that course. It contains information about text and on Page 2 information on important bibliography underlying course.
2	7-15-72	4 1 1 2	COURSE INVENTORY p. 1 Analytical p. 2 Justification p. 3 & 4 Prognostic	A basic document underlying each course. Controlled by the department head, it presents analytical and prognostic background. It also contains statements of justification. The prognostic part (2 pages) can be considered as an accounting base in which the departmental head records both SCH production generated and SCH program contribution to individual degree-major's. The historic information is used for planning and cost accounting. The form provides for aggregation of four quarters and totals are forwarded to two summarizing forms: Summary of Courses Taught During the Year For Each Level (Form 3) and Departmental Program Contribution Summary (Form 7).
3	7-15-72	1	DEPARTMENTAL SUMMARY OF COURSES FOR INDIVIDUAL LEVELS	All courses taught during a fiscal year (Su, F, W, Spr) are recorded for each separate level. Forecasts for the next year are expected to be recorded. It aggregates for that level the numbers of sections, students, TCH, SCH, and costs.
4	7-15-72	1	DEPARTMENTAL SUMMARY OF COURSES	An aggregation for information recorded on Forms 3.
5	7-15-72	1	SCHOOL OR COLLEGE SUMMARY OF COURSE PRODUCTION & COST	An aggregation from all departmental summaries (Form 4) giving production figures of school.

NO.	DATE	PAGES	TITLE	PURPOSE
6	7-15-72	1	UNIVERSITY SUMMARY OF COURSE PRODUCTION & COST BY SCHOOLS OR COLLEGES	A final aggregation from all school summaries (Form 5) giving total output figures for the instructional activities of university.
7A	7-15-72	1	DEPARTMENTAL PROGRAM - CONTRIBUTION FROM COURSES UNDERGRADUATE DEGREE MAJOR	Form 2C (Course Inventory contains a listing of the *contributions* of a specific course or other instructional session to a *degree-major-program*. Form 7A summarizes such contributions from all instructional sessions contributing to a *specific degree-major* on the undergraduate level.
7B	7-15-72	1	DEPARTMENTAL PROGRAM CONTRIBUTION FROM COURSES PROFESSIONAL PROGRAMS	Same as 7A; aggregating all instructional sessions to a specific professional program.
7C	7-15-72	1	DEPARTMENTAL PROGRAM CONTRIBUTION FROM COURSES GRADUATE PROGRAMS	Same as 7A and 7B; aggregating all instructional sessions to a specific graduate program.
8	7-15-72	1	DEPARTMENTAL PROGRAM CONTRIBUTION SUMMARY	Summary from Forms 7A, B and C.
9	7-15-72	1	DEPARTMENTAL PROGRAM REPORT	Summarizes the contributions to the program under the control of the department; it includes the contributions from own department, from other departments in the school and contributions from other schools.
10	7-15-72	1	COLLEGE OR SCHOOL PROGRAM SUMMARY	Aggregates Forms 9 within school or college.
11	7-15-72	1	PROGRAM SUMMARY FOR UNIVERSITY	Summarizes all programs recorded in schools or colleges on Form 11.

It should be understood the totals in the University Summary of Instructional Activities and that of programs should check each other.

COURSE-OBJECTIVES INVENTORY

School or College: Department:

Course Taught Last	197	197	197	197

Course Identification

ALPHA	NUMERIC

Departmental Title:

Part of Sequence YES ☐ NO ☐

Terms Offered

Preceding Course Following Course

Descriptive Title (including Content)

Objectives Attainment Measure	Percent Class Composition	No. Student's in Section _____
_____ Department Exam	_____ Junior Division	_____ No. Years in Teaching Course
_____ Instructor Exam	_____ Sr. Division	_____ No. Section Teaching
_____ National Exam	_____ Professional	_____ Teachers Rank
_____ Projects or Papers	_____ Graduate	_____ Contact Hrs. CR/HRS. _____
_____ Student Evaluation of Course		

Course and Lab Objectives: (Desired Changes in Students)

Text: Text Change Date:

Author: (Last, Init.)

Title:

Publisher (and City):

Date of Publication:

Chapters Used:

Comments As To Coverage of Topics, Expected Work Standards

Prepared By: (Instructor)	Departmental Review:		Analyst		Initials
	DEPARTMENT	HEAD INITIALS	NAME	DATE	

USED BY INSTRUCTOR

UNIVERSITY OF GEORGIA
FORD FOUNDATION PROJECT

PPBS FORM 1 (7-15-72)

COURSE-OBJECTIVES INVENTORY
BIBLIOGRAPHY (UNDERLYING COURSE)

COURSE INVENTORY

Part I: Analytical

School or College:	Department:

Course Identification		Part of Sequence YES ☐ NO ☐	
Alpha	Numeric	Preceding Course	Following Course

Required By						
SCHOOL						
MAJOR						
MINOR						
OTHER (Comment)						
ONE OF REQ'D SER.						

Type of Session		No. Sections	No. Labs

Class	Preferred Size	Section	Staff Required						Objectives Set By
	Maximum		No. EFT Inst.		No. EFT Lab				_____ Teacher
	Minimum		Number of Staff Preferred						
	Lab Size		Prof.	Asso.	Ast.	Instr.	Gra. A.	Other	_____ Dept. Syllabus
	Maximum								
	Minimum		No. Hrs/Week		No. SCH				_____ Other

Facilities (Use Code)									
	Available								
	Preferred								

Learning Resources or devices Required

Effect of Course (As related to other courses in dept., school, or University)

Courses Replaced						
Courses in which enrollment will reduce						
This course prerequisite (for)						
Prerequisite courses						
Courses with same content						
Alternative courses for credit						
Courses for transfer acceptance from Ga. system						

Analysis Comments

Student/Faculty Ratio Per Section						
				Range	Average	

USED BY DEPARTMENT

UNIVERSITY OF GEORGIA
FORD FOUNDATION PROJECT

PPBS FORM 2A (7-15-72)

Course Identification

COURSE INVENTORY

Part 2: Justification

1. Distinctive factors justifying this course

2. Extent of content duplication with other courses

3. Safeguards against duplicate credit

4. Other comments

COURSE INVENTORY

Sch/Course	Level				Part 3: Prognostic
** $/SCH	$/TCH				Course Identification
Sections	Su	F	W	Sp	Alpha / Numeric

Prognostic Information	Enrollment (SCH) SU	F	W	SPR	YEAR	Teaching Con.(Tch)	Infla. Factor	Course Cost $		Dep't Majors STD'S	SCH	From other dep't majors STD'S	SCH	From other school majors STD'S	SCH
Past Year															
Current Year															
Next Year															
19 to 19															
19 to 19															
19 to 19															

DISTRIBUTION TO PROGRAM PACKAGES (MAJORS) *

Current Year Code	SCH	%	$	Next Year Code	SCH	%	$	19 – 19 Code	SCH	%	$	19 – 19 Code	SCH	%	$
Total				Total				Total				Total			

Means for Evaluation Objectives

Comments Related to Prognostication & Budget

**COST STANDARD

* IF INSUFFICIENT SPACE (GREATER NUMBER OF MAJORS) ADD PAGE

UNIVERSITY OF GEORGIA
FORD FOUNDATION PROJECT

PPBS FORM 2C (7-15-72)

Page

DISTRIBUTION TO PROGRAM PACKAGES

Current Year				Next Year				19 – 19				19 – 19			
Code	SCH	%	$	Code	SCH	%	$	Code	SCH	%	$	Code	SCH	%	$
Forward															
Total		100		Total		100		Total		100		Total		100	

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

PPBS FORM 2D (7-15-72)

SCHOOL OR COLLEGE | DEPARTMENT | LEVEL

DEPARTMENTAL SUMMARY OF COURSES (4 QUARTERS)

COST PER TCH ON THIS LEVEL $ | AVERAGE COST PER SCH IN DEPT. $

		Current Year Ending June 30th, 19							Next Year Ending June 30th, 19						
	Course #	SEC	Student	TCH	SCH	$		Cost/SCH	SEC	Student	TCH	SCH	$		Cost/SCH
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
Total or Forward															

SCHOOL OR COLLEGE _____ DEPARTMENT _____

DEPARTMENTAL SUMMARY OF COURSES (4 QUARTERS) ON ALL LEVELS

CURRENT YEAR ENDING BOTH JUNE 19								NEXT YEAR ENDING BOTH JUNE 19 __							
Level	Course/ Section	Stud.	SCH	TCH	Cost/ TCH	$	Cost/ SCH	Level	Course/ Section	Stud.	SCH	TCH	Cost/ TCH	$	Cost/ SCH
JD								JD							
SD								SD							
PROF								PROF							
GRAD								GRAD							
TOTAL								TOTAL							

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

USED BY DEPARTMENT

PPBS FORM 4 (7-15-72)

SCHOOL OR COLLEGE SUMMARY OF COURSE PRODUCTION & COST

School or College

	Department	CURRENT YEAR						Y + 1		Y + 2		Y + 3	
		Courses	Sect.	Stud.	TCH	SCH	$	SCH	$	SCH	$	SCH	$
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													

UNIVERSITY SUMMARY OF COURSE–PRODUCTION & COST

Schools or Colleges	Current Year						Y + 1		Y + 2		Y + 3	
	Course	Sect.	Stud.	TCH	SCH	$	SCH	$	SCH	$	SCH	$

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FOR PROVOST OFFICE

PPBS FORM 6 (1 15 72)

DEPARTMENTAL PROGRAM CONTRIBUTION FROM COURSE

Program Code

Undergraduate Degree Major

School

Department

Level	Course	Current Year			Next Year			19 – 19			19 – 19		
		SCH	S		SCH	S		SCH	S		SCH	S	
JD	Subtotal												
SD	Subtotal												
TOTAL													

FOR DEPARTMENTAL USE

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FPBS FORM FA 17-19-221

Program Code

DEPARTMENTAL PROGRAM CONTRIBUTION FROM COURSES
PROFESSIONAL DEGREE PROGRAMS

School
Department

Level	Course	Current Year			Next Year			19 – 19			19 – 19		
		SCH	$		SCH	$		SCH	$		SCH	$	
TOTAL													

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FOR DEPARTMENTAL USE

FORM PPBS 7B (7-15-72)

DEPARTMENTAL PROGRAM CONTRIBUTION FROM COURSES
GRADUATE DEGREE MAJOR:

Program Code

School
Department

Level	Course	Current Year			Next Year			19 – 19			19 – 19		
		SCH	$		SCH	$		SCH	$		SCH	$	
TOTAL													

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FOR DEPARTMENTAL USE

PPBS FORM 7C (7-15-72)

Program Code

DEPARTMENTAL PROGRAM CONTRIBUTION SUMMARY

School Department

Level	Current Year		Next Year		19 – 19		19 – 19	
	SCH	$	SCH	$	SCH	$	SCH	$
JD								
SD								
Professional								
Graduate								
TOTAL								

FOR DEPARTMENTAL USE

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

PPBS FORM B (7-15-72)

DEPARTMENTAL PROGRAM REPORT

Program Code _____ Department _____ School _____ Year Ended _____

Contribution From	JD		SD		Professional		Graduate		TOTAL	
	SCH	$	SCH	$	SCH	$	SCH	$	SCH	$
Own Departments										
Depts. In Own School:										
Other Schools:										
TOTALS										

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FOR DEPARTMENTAL USE

PPBS FORM 9 (7-15-72)

COLLEGE OR SCHOOL PROGRAM SUMMARY

School

Year Ended

Degree - Major		JD		SD		Professional		Graduate		TOTAL	
Code	Program	SCH	$	SCH	$	SCH	$	SCH	$	SCH	$
TOTAL											

USED BY DEAN

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

PPBS FORM 10 (7 15 72)

PROGRAM SUMMARY FOR UNIVERSITY

Year Ended

No. of Programs	School or College	JD		SD		Professional		Graduate		TOTAL	
		SCH	$	SCH	$	SCH	$	SCH	$	SCH	$

FOR PROVOST OFFICE

UNIVERSITY OF GEORGIA FORD FOUNDATION PROJECT

FFBG FORM 11 (7-15-72)

UNIVERSITY OF GEORGIA
ACTIVITIES AND PROGRAM INFORMATION FLOW
WITH ILLUSTRATION OF FORMS*